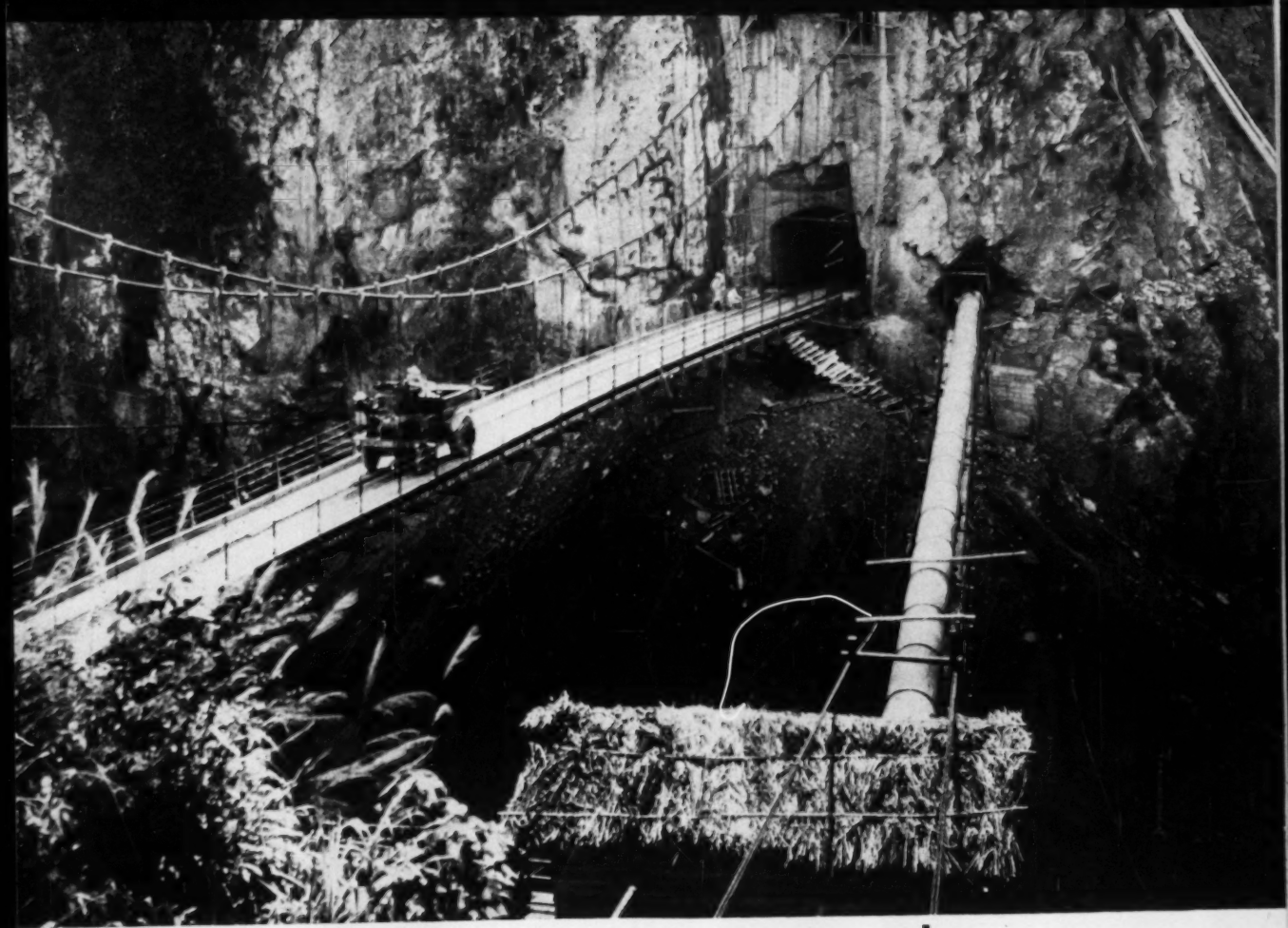
ENGINEERING NEWS-RECORD



In a Formosan mountain: a powerhouse p.30

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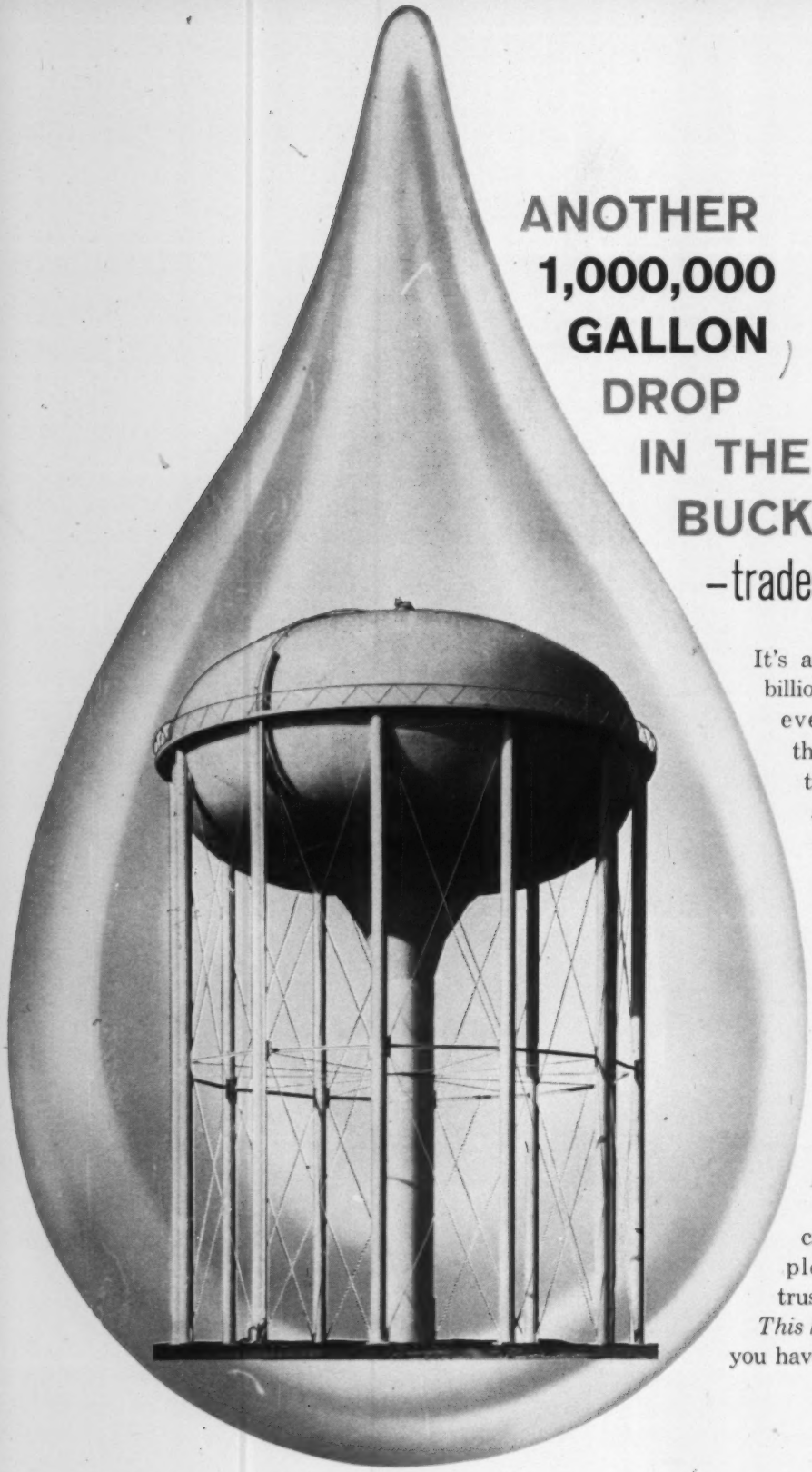

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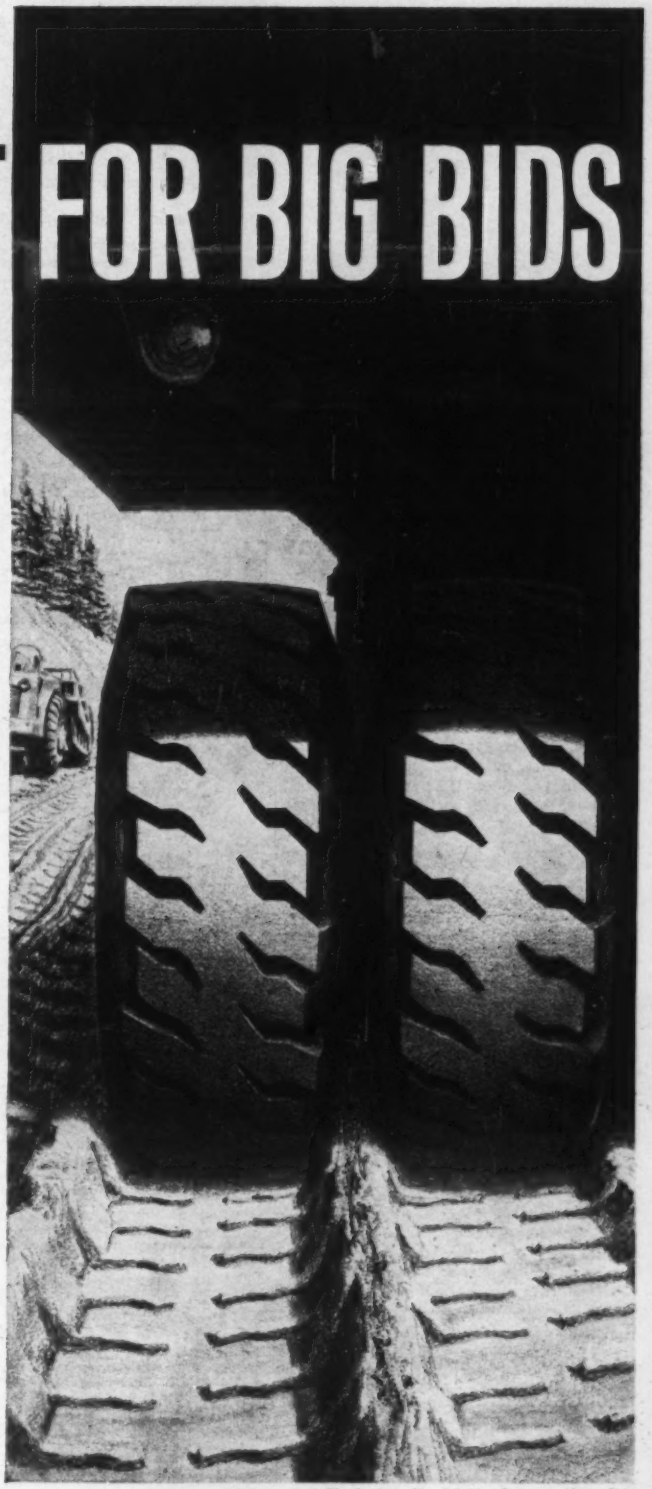

Competition for big jobs keeps you on your toes. That's why it pays to do everything possible to protect your profit margin. And much of your success on the big jobs rides on the tires you use.

Your Goodyear Big-Tire Specialist knows what problems you face in terrain, roads, climate, schedules and speeds. And he knows which tire is best for each need and how to keep costs in line. When you call him in for an analysis, you are assured his recommendations on tires will come from the most complete line of the world's toughest earth-mover tires.

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Jounce it over the roughest terrain and the Goodyear Super Road Lug shrugs off flexing, cuts and piercing blows. Reason? This tire embodies new and advanced super-toughening agents that make it super-tough on wear. What's more, rugged 3-T Processed Cord (nylon or rayon) — triple-tempered by Tension, Temperature and Time — give you unequalled tire strength and stamina.

Why not get the full story on the performance and savings that make the Super Road Lug your best bet for big jobs — and details on Goodyear Contractor Service — *before* your next bid. Just call your Goodyear dealer — or write Goodyear, Truck Tire Department, Akron 16, Ohio. Remember, lots of good things come from Goodyear.

Road Lug — T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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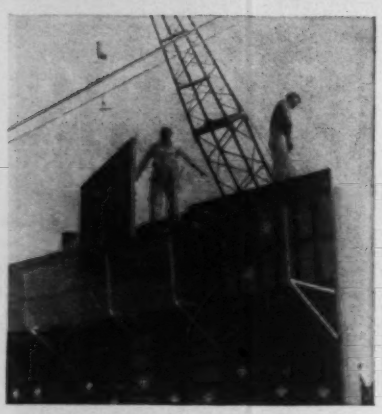
MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

9 Twin Bridges



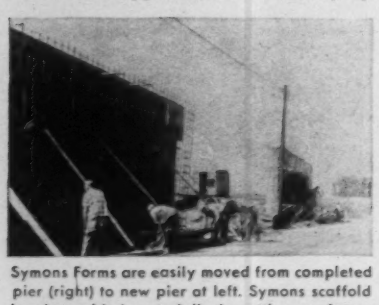
Symons Steel-Ply Forms Lick Tight Schedule

. . . Forms Set Horizontally and Stripped in Sections

Eight months to build the piers and substructure for nine twin highway bridges. Moore Brothers Construction Co., Verona, Virginia had this tight schedule to meet . . . and made it. Figuring concrete formwork correctly was an important factor in meeting the schedule.

The bridges are part of the 28-mile superhighway that connects the new Dulles International Airport at Chantilly, Va., with Washington, D.C.

On this project, the forms were assembled, stripped and moved easily by



Symons Forms are easily moved from completed pier (right) to new pier at left. Symons scaffold brackets aided materially in setting up forms.

manpower so that the forms could be reassembled on a second pier while the first was being stripped. Concrete was poured at the rate of about 3 feet an hour with each pier poured in a continuous operation.

The complete *Chantilly story* sent *free* on request. Symons Steel-Ply Forms are rented with purchase price.

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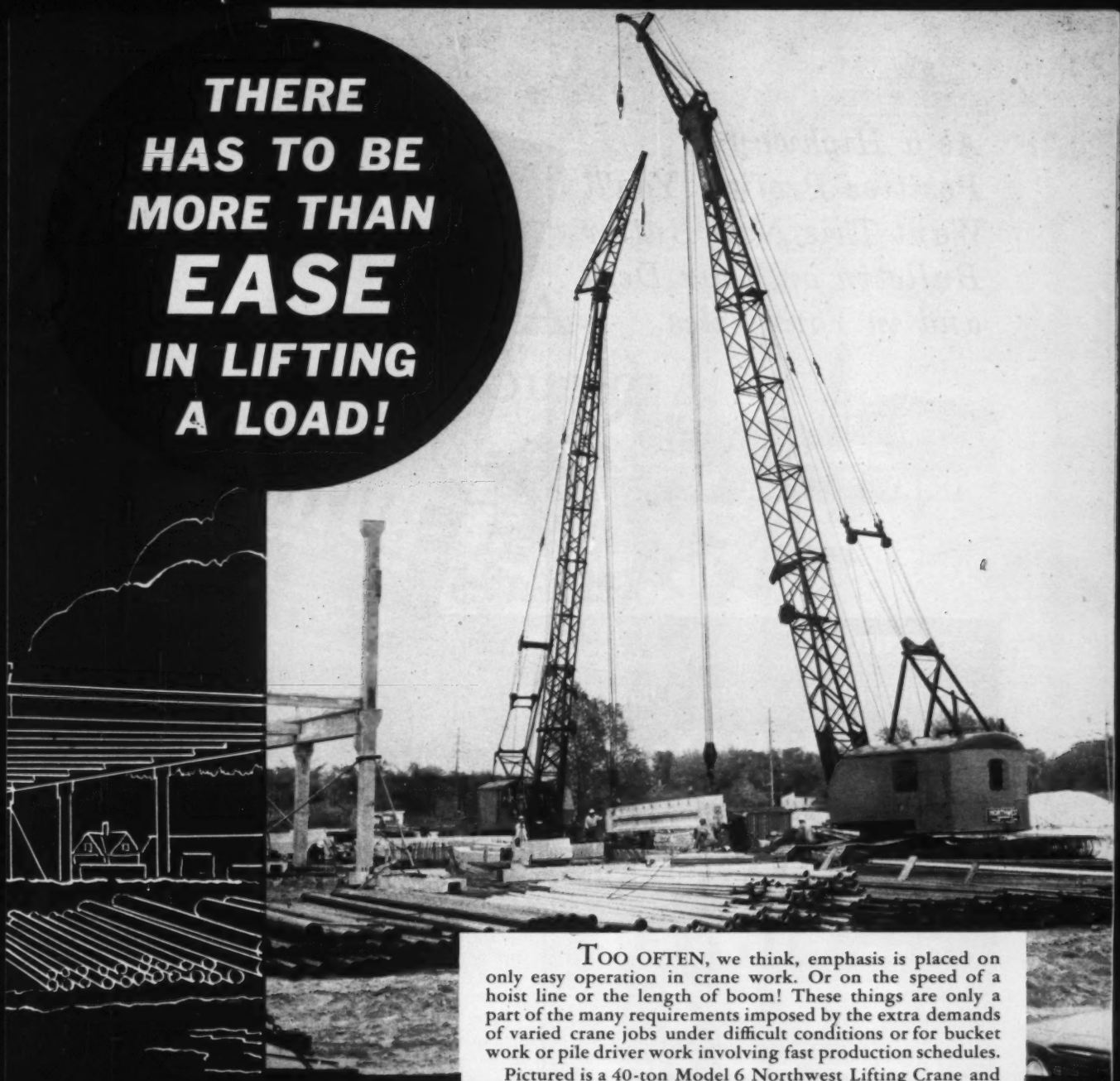
THERE HAS TO BE MORE THAN EASE IN LIFTING A LOAD!



TOO OFTEN, we think, emphasis is placed on only easy operation in crane work. Or on the speed of a hoist line or the length of boom! These things are only a part of the many requirements imposed by the extra demands of varied crane jobs under difficult conditions or for bucket work or pile driver work involving fast production schedules.

Pictured is a 40-ton Model 6 Northwest Lifting Crane and a 50-ton Model 95 Lifting Crane erecting an entirely precast structure. This was not a matter of weight. Either machine could have easily lifted the 23-ton pre-stressed beam. Here smooth teamwork accelerated the flow of the job, gave greater safety to the men on the structure and reduced the danger to the highly stressed beam.

Northwest Cranes fit themselves into jobs like this. Here the true "feel" of the load that comes with Power Feather-Touch Main Drum Clutch Control is highly important. The smoothness of the Northwest Independent High Speed Boom Hoist in hour after hour booming pays dividends. The positive velvet action of the Uniform Pressure Swing Clutches that gives you smooth swing where a jerk could wreck a beam means time and money.

These are just a part of the many Northwest advantages that get the job done faster. They are among the things that let you say, "That Northwest is always ready to go" — the advantages that make Northwest Cranes the finest machines of their kind.

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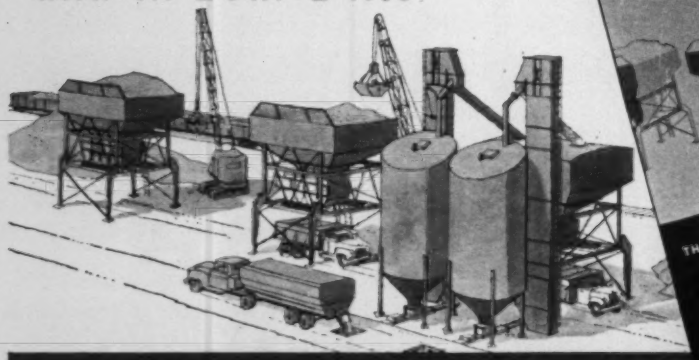
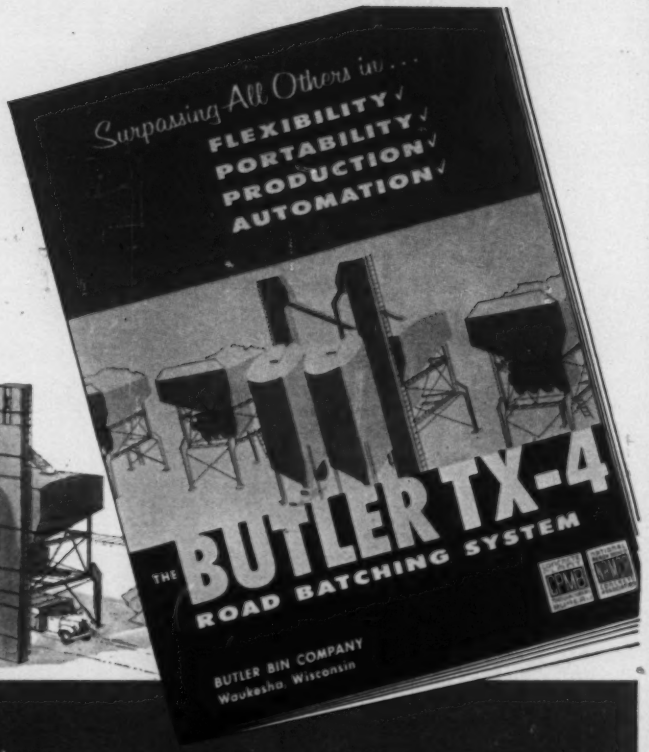
As a Highway to Positive Profit...You'll Want This New Butler Bulletin on Your Desk and in Your Files





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The Bulletin is technical, completely illustrated and diagramed in construction and engineering details as well as in operational procedures. It's conservatively factual and practical as a dictionary.

These same facts make clear why the Butler TX-4 holds every known world's record for batching speed . . . why the TX-4 adds a surprising "plus" in profits because of fast dismantling, transport and re-erection . . . and why only one operator, through Butler Automation, triggers the highest, split-pound precision in control of all batch ingredients.

So — now, while you're thinking of it, write for your copy of the new Butler TX-4 Bulletin. A postcard will get prompt results . . . So will the coupon below. The choice is yours — but do it now before your busy day crowds it from your mind.

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PAVES QUALITY MAT AT 140 FPM, ELIMINATES SECOND FINISHER

Big Barber-Greene finishers on tracks and rubber acclaimed paving pacemakers by owners in South Carolina, West Virginia

Two new high-capacity Barber-Greene finishers—the SA-60 crawler-mounted machine and the pneumatic SB-60 model—are proving with unmatched high capacity high quality production that they deserve the title of paving pacemakers.

E. G. Shuler, General Superintendent for J. F. Cleckley & Co., Orangeburg, S. C., reports on the crawler-mounted SA-60 model:

"Our big SA-60 really cuts the mustard for us putting down high quality mat at 140 fpm for as long as we can keep trucks out in front. We averaged 90 fpm on one 11′ paving job where we had binder courses of 1″ and 2″ and a 1″ top course. We intended when we bought this model to eliminate a second finisher on our jobs, and the SA-60 does just that.

"We've owned Barber-Greene finishers since we started in the hot mix business back in 1950, but we've never had a machine that could handle the tonnage this model does. We've already put 65,000 tons through the machine this season with no maintenance problems. And our operators love it."

Pneumatic Model SB-60 praised

Acme Construction Co., Beckley, W. Va., prefers the same machine mounted on rubber tires—the SB-60—for these reasons:

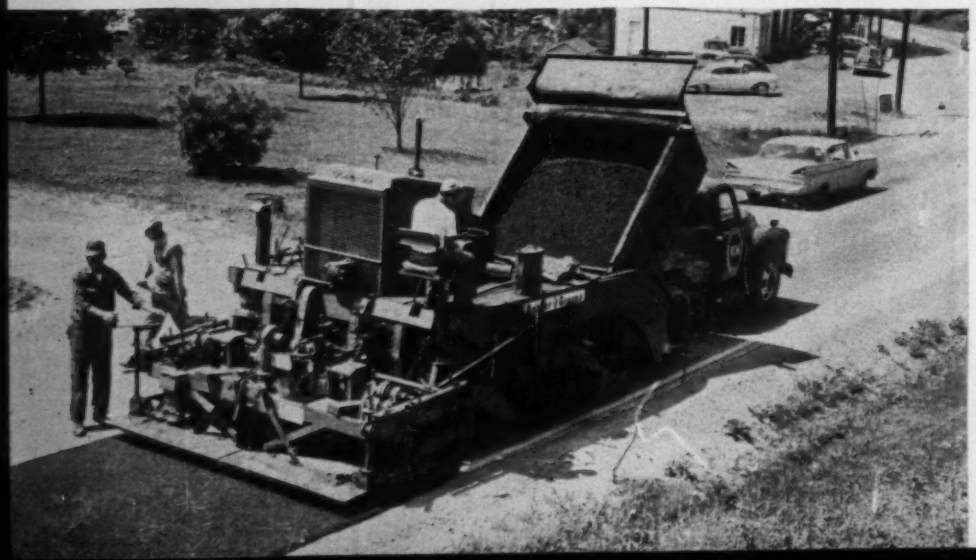
Supt., J. B. Bibb, "Our SB-60 Barber-Greene gives us higher laying and travel speed than we've ever gotten with any paver. It lays a level mat on the most adverse base conditions.

"Long runbacks used to mean shutting down our plant for as much as 30 minutes—but not since the SB-60 came on the scene. The SB-60 travels back at speeds to 15 mph, so the plant keeps running and there's no build-up of trucks."

13 fast width changes

E. L. Spencer, operating foreman, adds, "On our present job, we hit 13 mat width changes in 1,500 lineal feet. The ease with which we can cut-off or extend normal laying width with the SB-60 is a big time saver. Also, the big power, traction, oscillating truck push-rollers and power steering lets us breeze through this job over hilly terrain with steep grades and almost continual turns. We're 100% satisfied."

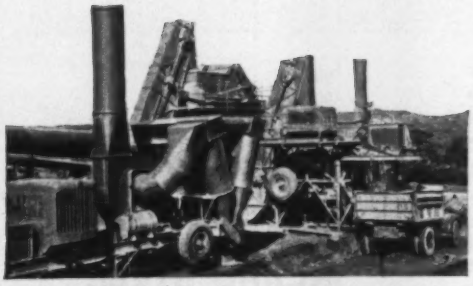
Get full facts on both models from your Barber-Greene Distributor. Either the SA-60 or SB-60 will give you highest capacity performance and make the most of your plant, your truck fleet, and your manpower.



RUBBER-TIRED SB-60 BARBER-GREENE FINISHER is seen resurfacing U.S. 60 for Acme Construction Co., Beckley, W. Va. High capacity paver easily made 13 width changes on a 1,500′ stretch of this job. Fast runbacks—15 mph—eliminated 30 minute plant shutdowns previously experienced.

These new rubber-tired and crawler-mounted high capacity Barber-Greenes deliver unmatched asphalt paving performance through new operating features never before available on any asphalt finisher. Write for your copy of new 24-page catalog.

SA-60 CRAWLER-MOUNTED BARBER-GREENE FINISHER paves at 140 fpm for J. F. Cleckley & Co., Orangeburg, S. C. On 40,000-ton resurfacing job on U.S. 23 and U.S. 25 in South Carolina, foreman and opesator called it "easiest handling finisher to come down the pike."



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By using Celluflor for the 77,700-sq. ft. sub-floor, a West Coast company* saved over six months on the job schedule for an 8-story office building.

Celluflor has other advantages over poured construction, including substantial savings in structural steel and footings. The greatest saving from Celluflor, though, accumulates over the years, because of the electrical flexibility it provides. Service outlets can be installed anytime without expensive alterations.

Complete information on Celluflor is given in Catalog 270. Write for your copy—or see Sweet's, Section 2b/In. For help on specific problems, call your nearby Inland office. A trained sales engineer is available for consultation.

*Name upon request

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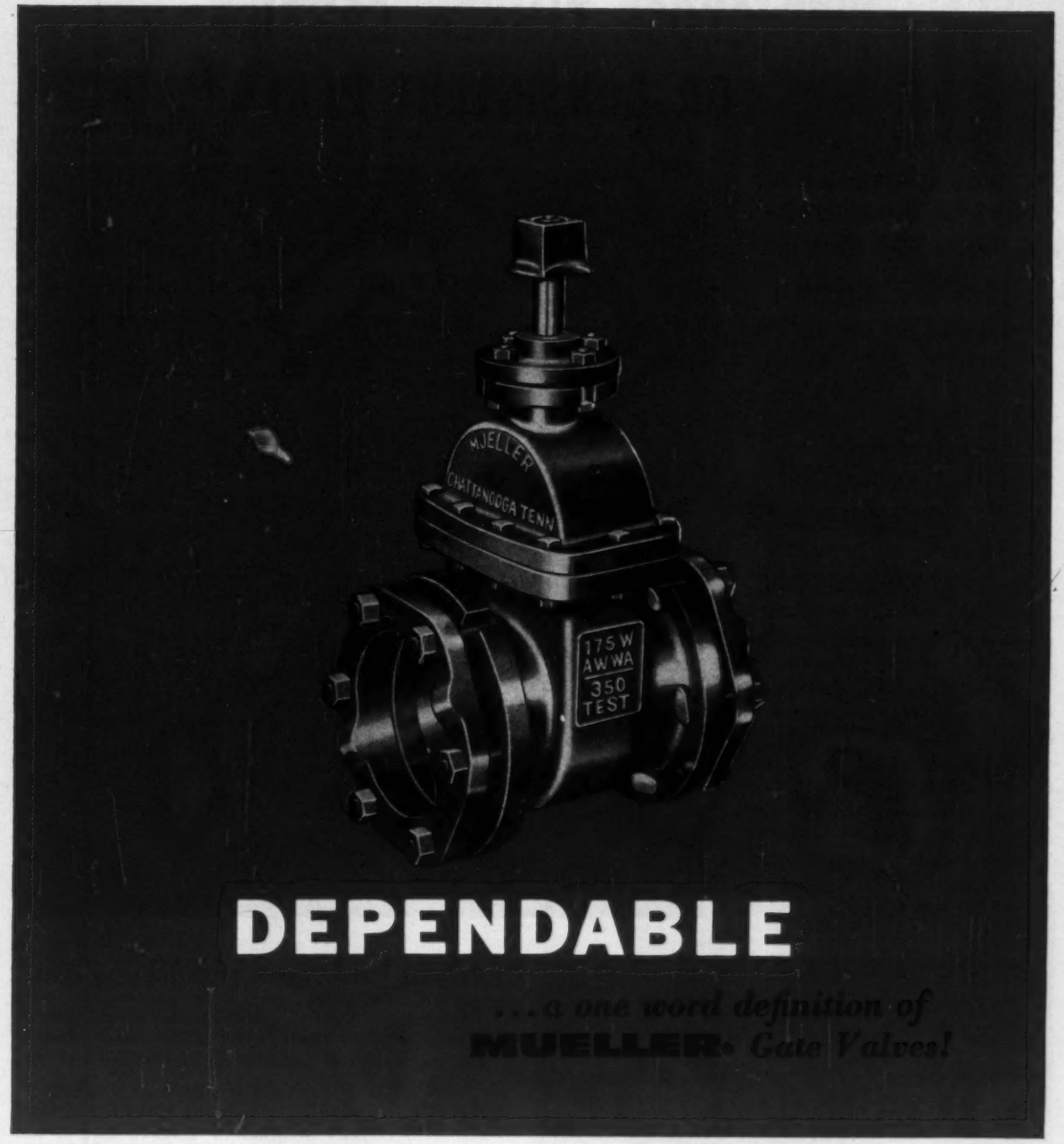

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"WE CHOSE TIMKEN® CARBIDE INSERT BITS FOR CONSISTENT PERFORMANCE"

Special report from Channel Constructors

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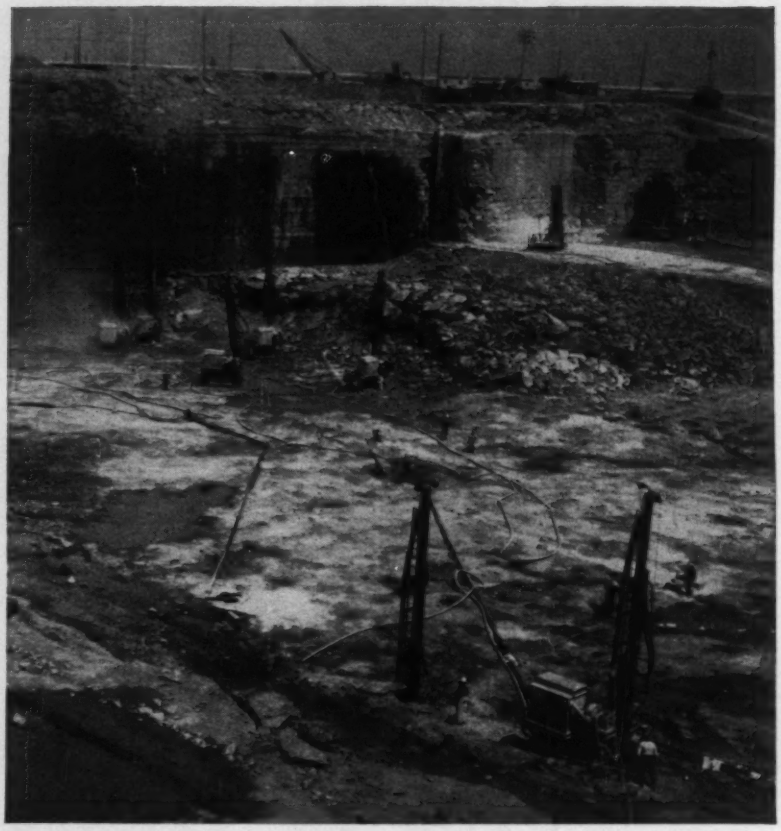
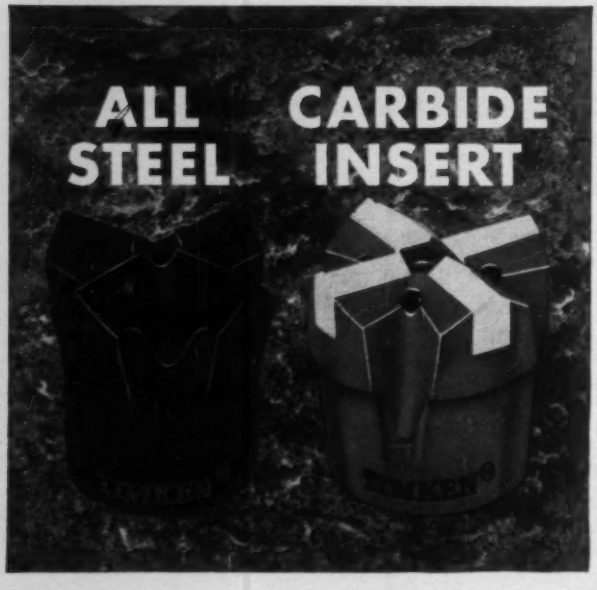
LOCATION: Niagara Falls Power Project

•

OPERATING CONDITIONS: Rock-Lockport Dolomite



Reports from the Niagara Power Project prove again that Timken® carbide insert bits give the most economical service. Timken bits were used in drilling the 500 ft. wide, 100 ft. deep cut shown at the right. Channel Constructors chose Timken carbide insert bits because of their consistent performance on the rock drilling phase of this project. Users of Timken bits everywhere report such savings—more feet-per-bit, longer bit life, fewer lost holes.



Which Timken Bit should you use?

Your most economical bit for hard, abrasive ground is the Timken carbide insert bit. In softer ground, use the low-cost Timken all-steel multi-use bit. Because both bits are interchangeable in the same thread series you can switch bits when the ground changes. Dozens of different Timken bits fit the same drill steel. Both types are made from Timken electric furnace fine alloy steel, have special shoulder unions that protect threads against drilling impact. Let us help you select the Timken bit that will do the most economical job for you. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

TIMKEN®

removable rock bits

Money Talks? No, It Yells

SIR—I take argument with the ideas expressed by Mr. Pennell regarding engineering salaries and support those of Professor Holcomb.

First, the comment that there are "many engineers with a high school education who now supervise many engineers with college degrees." This may be true in a few instances but for each of these, I am certain, countless others exist wherein the reverse is true. In addition, with talk of increasing the engineering educational requirement to five years, with more engineers finding it desirable and in some cases necessary to take advanced engineering study, with the rapid advancement of the electronic computer and other new ideas, how can you put the high school graduates on a par with these engineering graduates? Is it not degrading to our profession to even think of such a comparison?

A few cases exist, where high school people still supervise, it is true, but these will soon be nonexistant as retirements take place. Mr. Pennell is obviously living in the past for it is well known that today almost all engineering classifications must be filled by graduate engineers, who in many cases must be registered as well. For those few positions available to high school people, promotion to a supervisory position is almost out of the question.

Secondly, Mr. Pennell comments about an educational institution being unable to teach leadership. This, of course, is quite true. He also says we should encourage these people in leadership. I am sure my students would not be "encouraged" by talk of being supervised by people with high school training only.

Finally, it would seem, he ought to talk to our young people. He says we ought not "hold out financial attractions to them." Why do young men or women choose engineering as their career? I will wager that many young people choose it as their vocation because engineering appears as a respected social position in a growing field with a good starting salary. I will also wager that of those items mentioned, salary is most important. With civil engineering on the bottom in this category, one can easily see why other fields are being chosen.

One sure way to keep civil engineers on the bottom is to belittle the formal education which they need. Another way is to continue to live in the past. Perhaps money shouldn't talk, but let us face reality. Today it more than talks—it yells!

DONALD R. BUETTNER
Instructor of Civil Engineering
University of Wisconsin
Madison, Wis.

Editor's Note: Mr. Pennell's comment (ENR Nov. 17, 1960, p. 6) was on views expressed by ASCE President Glenn Holcomb in our recent cover story (ENR Oct. 20, 1960, p. 74).

Anti-Freeze for Winter Fill

SIR: Mr. Gordon MacKenzie's article, "Canada's Biggest Earth Fill Goes Year-Round" (ENR Aug. 4, 1960, p. 34) discusses the physical and mechanical aspects of cold-weather earth moving, but says nothing about any detrimental effects freezing might have on the permanent stability of the embankment. Presumably there were no problems in this case; however, frozen embankment can cause serious problems.

I have observed severe break-up of pavements at a number of airports that had been constructed with frozen earth. In the spring thaw the subgrades literally turned to mud.

After seeing these dire consequences of winter construction, I became involved in pavement design for a major air base in Idaho. Due to great urgency, grading had to be carried out during the winter. I recommended the addition of ordinary crude solar salt from Great Salt Lake in Utah to all sprinkling water.

The use of salt as an "anti-freeze" permitted earth subgrade and granular base materials to be watered and compacted throughout most of a cold winter. The unfrozen earthwork, surrounded on all sides by solidly frozen topsoil, was a source of amazement to many who visited this job.

It is difficult to understand why this simple and relatively inexpensive procedure has not been used more widely for lengthening the season during which earth embankment can be placed.

H. R. CEDERGREN
California Division of Highways
Sacramento, Calif.

Editor's Note: Author Gordon MacKenzie tells us that only clean dry granular material was placed in the downstream section of the dam during the winter months. Specifications for the impervious section do not permit placement of frozen materials or placement of any material on a frozen embankment.

Cipherectomy Prescribed

The installed capacities tabulated on p. 22, ENR Oct. 27, 1960, have either three too many zeros or improper column headings, depending on your point of view. At any rate, the values listed are in kilowatts, not in thousands of kilowatts.

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No wonder owner after owner reports that 230-hp "25's" outwork king-sized clutch-steered crawlers, up to 50%! Prove to yourself what it means to own the capacity-boosting advantages of full-power momentum – full time, as *standard equipment!* Let your International Construction Equipment Distributor demonstrate the TD-25!

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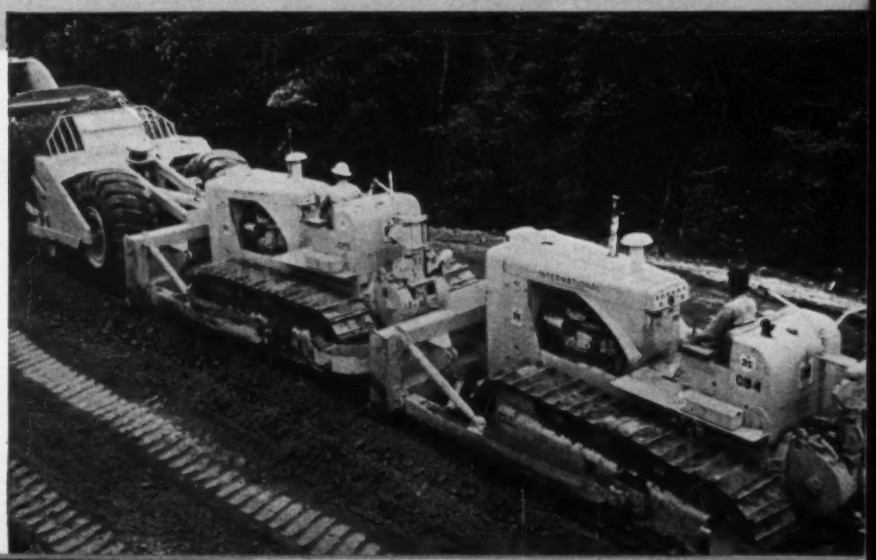


Calgary Power installs first USS "T-1" Steel penstock in America

Near Chinaman's Peak in the Canadian Rockies, Calgary Power, Ltd., has completed the first penstock in this hemisphere built with USS "T-1" Steel. The 1,601-foot-long, 8′ diameter penstock is part of their "Spray No. 2 Project" to produce more hydroelectric power for the Calgary Power System in Alberta, Canada.

Montreal Engineering Co., Ltd., who recognized the value of USS "T-1" Steel as an excellent constructional alloy steel for such applications as high head penstocks several years ago, proposed its use when the design work for Calgary's "Spray No. 2 Project" was started.

Montreal Engineering Company's engineers specified USS "T-1" Steel for this penstock because the steel's minimum yield strength of 100,000 psi made possible nearly a 50% savings in the amount of steel required. This saving helped to reduce substantially the transportation and erection costs that would have been required had structural carbon steel been used in this mountainous location.

In the new Calgary penstock, 500 tons of USS "T-1" Steel plate 5/16" to 3/4" thick were used by Dominion Bridge to fabricate the segments, or "cans" in its Calgary plant. These segments are 8′ to 7′ in diameter.

It was significant that the penstock was designed to a 37,000 psi unit working stress (or approximately 41,000 psi unit stress at 90% joint efficiency). This is more than 28% greater than the ASME code case 1204-4 allows for pressure vessels fabricated of "T-1" Steel in the United States.

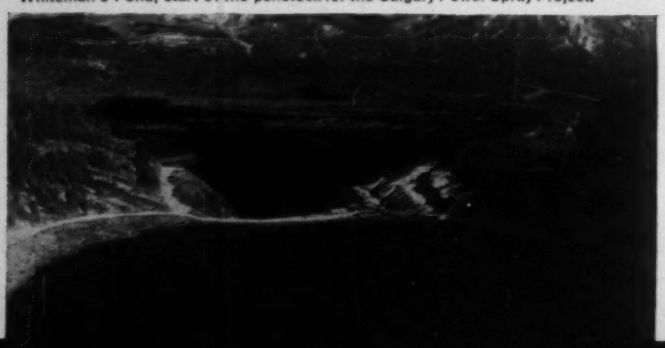
The upper exposed length of the USS "T-1" Steel penstock will come down the mountain at various slope angles with a maximum of 50 degrees for 1,400 feet above the tunnel and approximately 50 degrees in the 220-foot-long tunnel at the bottom. The water will have a head of 905 feet and will drive a turbine to produce 50,000 KW of electric power.

USS "T-1" Steel was selected for its exceptional strength and toughness, even at very low temperatures, and its ready weldability. What's more, it eliminates the cost of stress relieving.

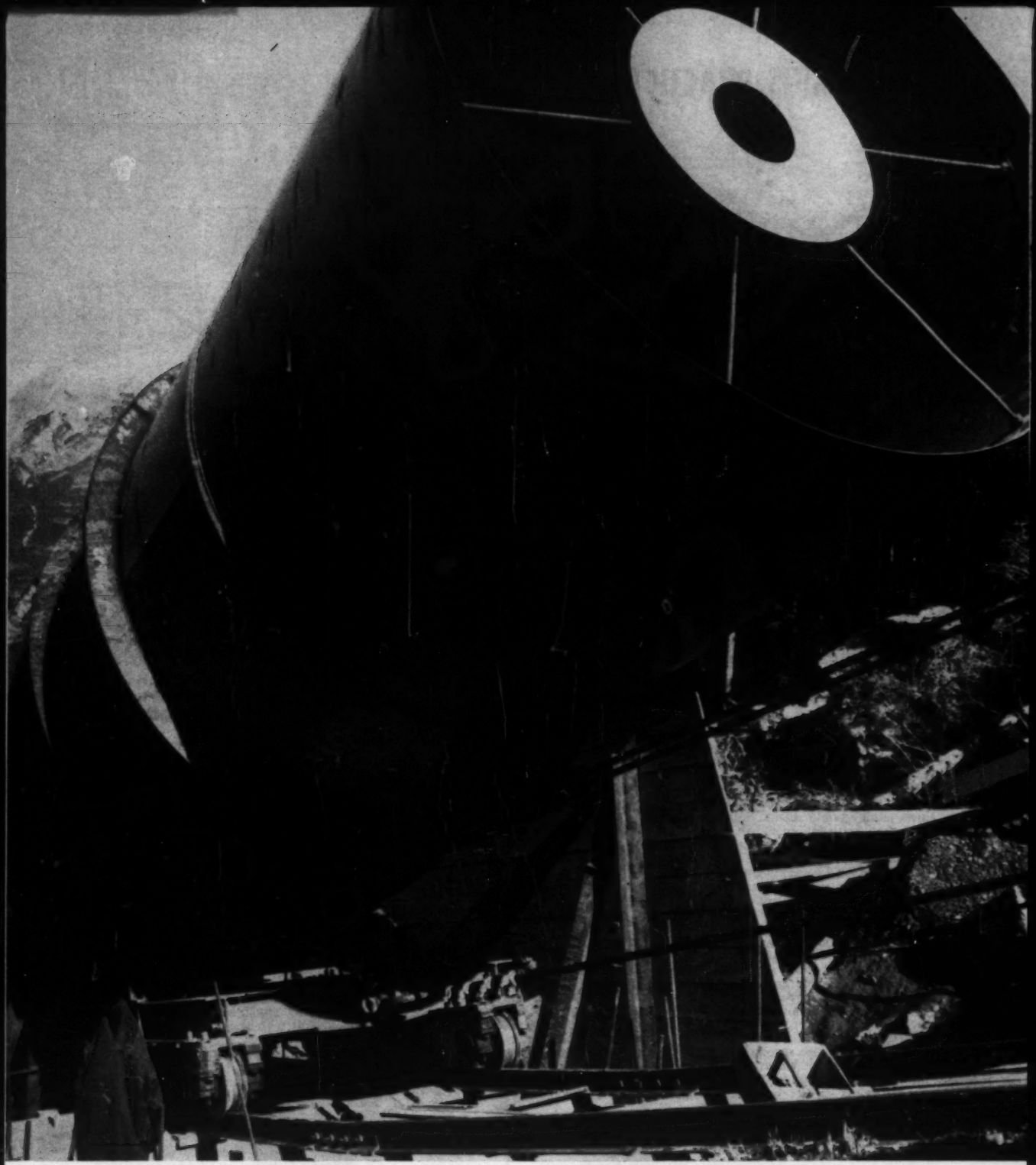
For more information about USS "T-1" Steel, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks

Whiteman's Pond, start of the penstock for the Calgary Power Spray Project.



This mark tells you a product is made of modern, dependable Steel.



Above-ground penstock section of USS "T-1" Steel winds downward from Whiteman's Pond through the wild grandeur of the Canadian Rockies.

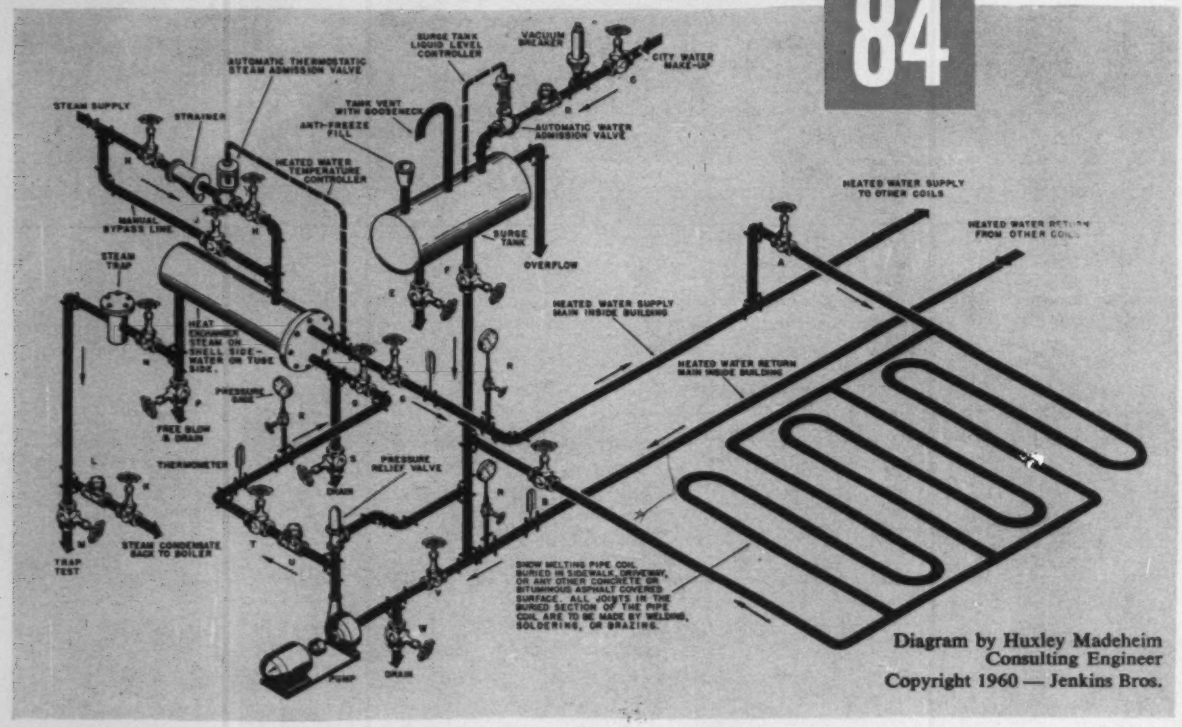
United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS

JENKINS PRACTICAL PIPING LAYOUT

84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STRAINER
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HEATED WATER SUPPLY TO OTHER COILS
HEATED WATER RETURN FROM OTHER COILS
MANUAL BYPASS LINE
SURGE TANK
OVERFLOW
STEAM TRAP
HEAT EXCHANGER STEAM ON SHELL SIDE-WATER OR TUBE SIDE.
HEATED WATER SUPPLY MAIN INSIDE BUILDING
HEATED WATER RETURN MAIN INSIDE BUILDING
PRESSURE GAGE
FREE BLOW & DRAIN
THERMOMETER
PRESSURE RELIEF VALVE
DRAIN
STEAM CONDENSATE BACK TO BOILER
TRAP TEST
SNOW MELTING PIPE COIL BURIED IN SIDEWALK, DRIVEWAY, OR ANY OTHER CONCRETE OR BITUMINOUS ASPHALT COVERED SURFACE. ALL JOINTS IN THE BURIED SECTION OF THE PIPE COIL ARE TO BE MADE BY WELDING, SOLDERING, OR BRAZING.
PUMP
DRAIN

Diagram by Huxley Madeheim
Consulting Engineer
Copyright 1960 — Jenkins Bros.

How to plan piping connections for a SNOW MELTING SYSTEM

For controlled melting of snow and ice, use of a warm fluid circulating in pipe coils buried in paving material is rapidly expanding. Piping may be steel, wrought iron, brass or copper depending on conditions.

Conditions encountered in the specific installation should dictate details of construction, so the layout shown here cannot represent necessarily correct installation practice for every job. Some factors to be considered are severity of snowstorms, prevailing temperature, speed of removal desired, heat sources available, heat losses, hydraulic requirements.

Hydraulic requirements are determined by the amount, size and arrangement (sinuous or grid coils) of pipe as they determine size of circulator or pump. Regardless of type of pipe circuit, friction loss should be kept as nearly equal as possible between all circuits, and when necessary to obtain approximately the same pressure drop to each circuit, valves or balancing cocks are recommended.

The heat required varies with conditions but an output of 100 to 200 BTU per hr. per sq. ft. of surface has been adequate for most installations. In addition to heat output at surface, there should be an allowance of 30 to 50 per cent for back and edge losses, this being related to amount of insulation and cycle of operation as well as to fuel costs.

Air pockets or collections in the system should be avoided, and where grading conditions require different parts of pipe system to be pitched in different directions, it may be necessary to provide air vent lines from high points of pipe loops and carry vent lines to air vent valves in a curb box.

Drains are generally provided at low points for draining coils if required although annual drainage is not necessary.

As a snow melting system is fundamentally a forced circulation hot-water system, most standard practices for a hot-water system may be followed in the boiler or heat exchanger hook-up.

The system shown here uses steam heated hot water at 212°F., to which is added conventional ethylene glycol anti-freeze and a rust inhibitor.

The expansion or surge tank should be of generous size because of the greater expansion properties of water containing anti-freeze. The tank not only serves to liberate air and provide for expansion but also allows for initial filling and subsequent addition of water and anti-freeze. Its provisions should meet all code requirements including a guarantee against contamination of city water supply by a treated liquid.

Jenkins Fig. 106-A screwed end bronze globe valve, (or equivalent Fig. 1270 with socket ends, or Fig. 1270 with solder ends), is used extensively throughout this layout. Its renewable disc assures drop-tight closure, and it has many other design and construction features which mean economical maintenance and long, trouble-free life. Valves should be packed with solvent resistant packing. Disc type valves should have Teflon discs.

To assure efficiency in the job when planning any major piping installation, consult with accredited piping engineers and contractors, and select your valves from the Jenkins Catalog.

Enlarged diagram and full description of this layout No. 84 free on request to Jenkins Bros., 100 Park Ave., N. Y. 17.

CODE	QUAN.	JENKINS VALVE	SERVICE
A	1 per coil	Fig. 47-U, Bronze Gate	Coil Shutoff
B	1 per coil	Fig. 106-A, Bronze Globe	Regulate Flow Thru Coil
C	1	Fig. 106-A, Bronze Globe	Regulate and Shutoff City Water
D	1	Fig. 92-A, Bronze Swing Check	Prevent Backflow Into City Water Lines
E	1	Fig. 106-A, Bronze Globe	Surge Tank Drain
F	1	Fig. 106-A, Bronze Globe	Surge Tank and Balance System Control
G	2	Fig. 47-U, Bronze Gate	Tube Side of Heat Exchanger Shutoff
H	2	Fig. 47-U, Bronze Gate	Automatic Valve Shutoff
J	1	Fig. 106-A, Bronze Globe	Manual Bypass Control
K	1	Fig. 47-U, Bronze Gate	Shutoff System From Steam Condensate
L	1	Fig. 92-A, Bronze Swing Check	Prevent Steam Condensate Backflow
M	1	Fig. 106-A, Bronze Globe	Trap Test Control
N	1	Fig. 47-U, Bronze Gate	Steam Trap Shutoff
P	1	Fig. 106-A, Bronze Globe	Free Blow and Drain Shell Side of Heat Exchanger Control
R	2	Fig. 743-G, Bronze Needle	Pressure Gage Control
S	1	Fig. 106-A, Bronze Globe	Tube Side of Heat Exchanger Drain
T	1	Fig. 106-A, Bronze Globe	Regulate Pump Discharge and Shutoff Pump
U	1	Fig. 92-A, Bronze Swing Check	Prevent Backflow Into Pump
V	1	Fig. 47-U, Bronze Gate	Pump Shutoff
W	1	Fig. 106-A, Bronze Globe	Pump Drain

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

STUD BOLT BECOMES A BULLET—A bank clerk sitting at his desk in an 11th floor office was wounded seriously by the accidental firing of a stud gun used on a construction job across the street. Workmen on a 24-story office building project in New York's financial district were firing 2-in. studs into concrete.

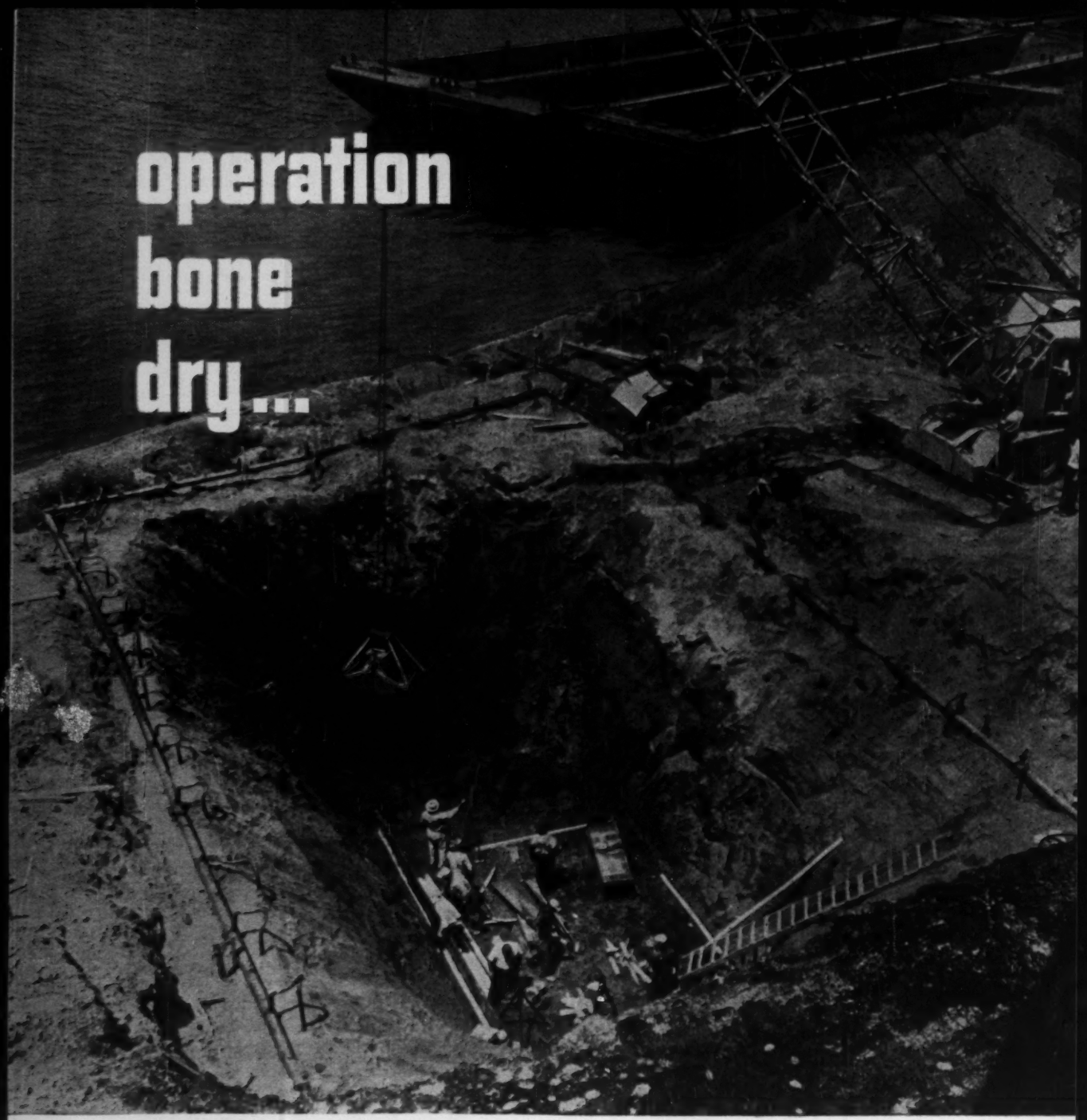
BIG DESIGN CONTRACT COMING—Watch for a design contract of about $300,000 from AEC for the world's largest and most powerful electron accelerator —a 10-to-20-billion electron volt installation tunneled 10,000 ft through a hill at Stanford University in Palo Alto, Calif. The three-firm joint venture negotiating with AEC: John A. Blume & Associates, San Francisco; Aetron Division of Aerojet-General Corp., Covina, Calif.; and Guy F. Atkinson Co., South San Francisco. The accelerator will cost over $107 million to build.

WHAT A DIFFERENCE A YEAR MAKES—Completion of a double-deck bridge across the Ohio between Louisville, Ky., and New Albany, Ind., will be delayed a full year because of a clerical error in the advertisement for bids. The Indiana Highway Department listed September, 1962, as completion date for the Indiana approaches—it should have been September, '61. The contractor has agreed to undertake the work in a sequence that will permit use of the top deck sometime next fall.

BIGGEST GENERATORS AWARDED—The Tennessee Valley Authority has signed General Electric to build two 800,000-kw steam turbine-generators, the biggest ever constructed. GE's price of $30.4 million was less than 10% above the lowest foreign bid when guaranteed efficiencies were evaluated and taken into account. TVA allows domestic manufacturers a 20% preference. No site has been chosen yet.

FISHING WITH A $100-MILLION LURE—New York Gov. Nelson Rockefeller will ask his legislature this week to support a $100-million effort to stimulate industrial construction in the state. He wants an authority that can lend money to local nonprofit groups, which will help finance manufacturing plants for new industry.

WHAT A MENU—The agricultural and chemical division of Armour & Co. threw a lunch in Chicago last week and sent the invited guests home with nine contracts worth a total of nearly $60 million. Biggest piece was a $30-million contract for engineering-management and construction to M. W. Kellogg Co. of New York City for a nitrogen plant in Colbert County, Ala.; about $8 million worth went to Rust Engineering Co. of Pittsburgh for the engineering-management assignment on a phosphat plant in Polk County.



GRIFFIN **Solves Another Dewatering Problem!** This river-bank pumping station job on West Virginia's Ohio River required speedy predrainage so foundations could be completed during low water level. A Griffin drive-casing sand-wicked Wellpoint system was installed (through silt, sand and clay layers) in 3 days. 48 hours later, pumping had dropped ground water 20' below the Ohio, and the bottom slab was poured . . . Further proof of time and money saving advantages of rapid installation and smooth operation of Griffin Wellpoint equipment.

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WASHINGTON OBSERVER

- **To fight recession: construction**
- **Bigger federal role in transportation coming?**
- **Johnson to fight discrimination in hiring**

● **The Kennedy Administration will pump federal funds into construction projects** as one of its first anti-recession moves. Plans are ready for a large number of such projects—highways, housing, industrial and commercial buildings, public works of all kinds. This is seen as a quick way to get new money into the economy and provide jobs (see p. 21).

Chief economic adviser Walter N. Heller favors this approach—immediate boosts in federal spending on "pump-priming" public works projects. Also, his views on more liberalized depreciation allowances for plant and equipment will carry considerable weight with Mr. Kennedy.

—

● **Direct White House supervision of federal-aid highway construction** will be established if Mr. Kennedy accepts recommendations of James Landis, his adviser on federal regulatory agencies. And all signs point in this direction. It is doubtful that Mr. Landis would have accepted even a temporary White House assignment without such assurances.

Supervision of the Bureau of Public Roads would be one of the many tasks assigned to the new White House Office for Development and Coordination of a National Transportation Policy, proposed by Mr. Landis. This would, in effect, remove BPR from the Commerce Department.

A balanced transportation system for the country is the goal sought. Mr. Landis says the present supervisory system—allocated among a number of agencies—lacks coordination and fails to set an over-all policy to govern competition among the various forms of transportation.

Easy access to the President's ear, through a new office in the executive department, would remedy this, contends the Landis report. Present functions of the Undersecretary of Commerce for Transportation would be transferred to the proposed office. He also recommends:

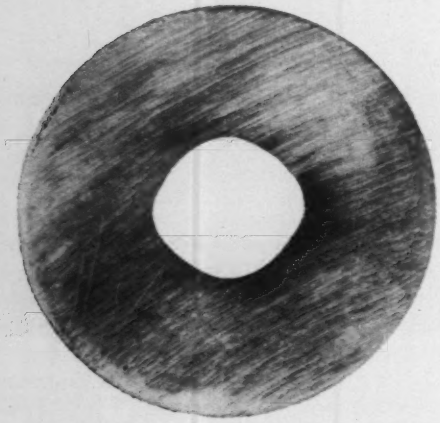
• Coordination of federal highway-aid programs with approved metropolitan transit plans, and establishment of metropolitan transit commissions with federal aid in matching guaranteed loans.

• A restudy of the entire field of user charges, including airplanes and inland waterways as well as highways.

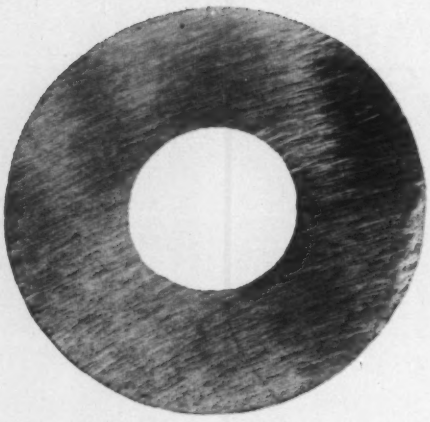
—

● **More active efforts to end racial discrimination in hiring under government-sponsored contracts can be expected** with Vice President-elect Lyndon B. Johnson at the helm. Not that Mr. Nixon was lax when he headed the Committee on Government Contracts, but many in Washington visualize Mr. Johnson using the post as a stepping stone to the Democratic presidential nomination in 1968.

The Johnson image as a Southerner was perhaps the major factor in his failure to win the nomination in 1960. A vigorous approach to the problem of economic discrimination, with the government committee as an ideal forum, might lend Mr. Johnson more national stature.



Cross section of average extension steel, showing distorted center hole.



Cross section of Sandvik Coromant Steel, showing perfectly uniform center hole.

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The completely unretouched photographs above show clearly why Sandvik Coromant large-diameter extension rods last longer! Since Sandvik takes the time—and the trouble—to cold-roll these alloy drill rods, the flushing hole is uniform all the way through—smooth as a gun barrel. And, since the hole is even and perfectly round, you set up fewer strains and stresses **in use**...there's less whipping... and therefore, less breakage. And, with mechanically stronger rods, we can provide larger flushing holes for faster, more complete removal of cuttings.

What's more, the Sandvik-originated rope-thread makes coupling and uncoupling a hand operation—speeds the job—and reduces chance of incipient cracks developing from wrench marks.

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Outlook for the 87th Congress

The change in the economic climate during the past six months has forced a new line of thinking on the Kennedy Administration even before it takes office. The "New Frontiers" is slowly being converted from a campaign manifesto for social progress into an anti-recession program.

President-elect Kennedy faces no such economic crisis as did Franklin D. Roosevelt in March, 1933. But he does face—along with the new Congress—a slumping business picture. His programs may still be similar to what he contemplated during the campaign, but the reasons behind them are becoming quite different.

Mr. Kennedy's primary concern now is to put unemployed Americans back to work. And he will sacrifice a balanced budget and a little more gold—if he must—to achieve this.

The economic slump actually will help Mr. Kennedy get through Congress several programs that otherwise might have run into trouble with the powerful coalition of Republicans and conservative Southern Democrats. Now there will be defections from these ranks to the Kennedy side.

Inflation still is a serious threat to the economy. But the Administration—and to an even greater extent members of Congress—will overlook this threat momentarily in an effort to end the recession and achieve full employment.

Here is a rundown on some of the major economic topics to be discussed by the new Congress:

I. Highways

Democrats face some crucial decisions this year on the future of the Interstate highway program. The main one is whether construction of the 41,000-mile road system is to be kept on schedule and completed in 1972, as originally planned, or whether it is to be stretched out.

Three new studies by the Bureau of Public Roads and state highway departments will help Congress make up its mind. One is a new estimate of the cost of the interstate system, which will be sent to the lawmakers January 10. The new cost figure will be about $41 billion, not significantly different from the 1958 estimate, but about $10 billion more than the original, hastily drawn estimate made in 1956.

Congress will have to come up with roughly this amount in additional revenue to finance the Interstate program. Thus it must decide whether to increase taxes, to divert funds from the general treasury, abandon the present pay-as-you-go financing and "borrow" from the Treasury, or leave the present inadequate financing as it is and stretch out the program.

Two other BPR studies, which went to Congress last week will help the lawmakers decide whether to hike taxes and how to spread the tax burden. One is a highway cost allocation study and the other is a study based on preliminary results of the Illinois road test conducted by the American Association of State Highway Officials.

The cost allocation report deals with the question of who benefits from the Interstate system. At present, highway costs are borne chiefly by users through payment of taxes on gasoline, tires, auto parts and accessories, heavy vehicles and a manufacturer's tax on trucks, buses and trailers. But Congress wants to know how much indirect beneficiaries of the highway program—such as factories, motels, service stations, real estate owners, etc.—gain from the new road system. It will then decide whether to extend part of the tax burden to them—either through new taxes or by diverting a specified amount of money from the general treasury to highways.

The AASHO road test will help settle the question of whether trucks and other types of vehicles are paying their just share of highway-user taxes.

Two other factors enter the highway financing picture: (1) the scheduled expiration June 30 of the fourth cent of federal gasoline tax imposed for the past two years and earmarked for the Highway Trust Fund; and (2) an expected recommendation from Mr. Kennedy's economic advisers that highway spending be stepped up as a means of helping the nation overcome the current business slump.

II. Housing, Urban Renewal

President-elect Kennedy has pledged action on an omnibus housing bill similar to the one that died in the final stages in Congress last year. Details of a new proposal are not ready yet, but a Kennedy task force is working on it.

Last year's bill contained $350 million in two-third matching grants for urban renewal projects. Under pressure from the big-city mayors, who were so influential in Mr. Kennedy's election, this amount may be upped to about $500 million. Since the money is not appropriated until the projects are completed, it would not have to come out of the new Administration's first budget.

The college housing loan program, which will be out of money by February, will get about $400 million a year. There will be something like another $4 billion in FHA authority to insure home mortgages (now almost out of money), an extension of FHA home improvement loans, perhaps with lower interest rates, and another $25 million or $50 million in loans for housing for the elderly.

Kennedy aides are also considering relaxation of lending terms, particularly a cut in the high interest rates on home improvement loans. An emergency appropriation for Fannie Mae, similar to the $1-billion increase enacted as a pump-primer during the 1957-58 recession, may get a push if a strong stimulant still appears necessary in February or March.

III. Public Works

Mr. Kennedy made a lot of campaign mileage in the West with his attack on the Eisenhower Administration's "no new starts" policy. As a matter of fact, the Democrats acknowledged that President Eisenhower and his Army Corps of Engineers and Reclamation Bureau were only keeping a tight rein on new projects for flood control and power development. New projects were being started, but not in the numbers the western Democrats wanted.

So the Kennedy program will attempt to satisfy the demands. Secretary of Interior Stewart Udall will seek more projects in the West, and a Democratic Congress will give him the go-ahead.

But the biggest public works controversy will be staged at the Federal Power Commission. There a decision will be made as to whether private utility companies, or a group of public utility districts will be licensed to develop the Middle Snake River. The competition is between the Northwest Power Group of private utilities, which wants to build a dam at High Mountain

Sheep, and the Washington Public Power System, which wants to build a dam at Nez Perce. There is also some question as to whether Canadian storage projects on the Columbia under the pending international agreement will change the economics of the two dams enough to postpone them. The Kennedy appointments to the commission, and he will have two, will control the decision.

Water projects are traditionally thought of as anti-recession measures, though more sophisticated experts acknowledge that the pumping out of money for major projects is too slow to remedy any emergency. Corps of Engineers and Reclamation Bureau officials argue that the merits of their projects should be judged by necessity rather than by emergency.

IV. Depressed Areas

Smaller amounts of construction money will come out of depressed areas legislation and a stepped-up construction program for sewage treatment works—both measures that were vetoed by Mr. Eisenhower. A task force is now preparing a depressed areas bill which may well be the first item of legislation. It will include between $300 million and $400 million in low interest loans and grants to attract new industries to distressed areas, some of it in construction of plant facilities or necessary public works such as water and sewage lines. A bill doubling annual grants for sewage treatment works from $50 million to $100 million stands an excellent chance of passage.

There will be pressure from Rep. John Blatnik (D., Minn.) and his colleagues to reorganize the pollution program, to give it greater status, and possibly to establish the office outside the Public Health Service.

V. Missile Bases

Expenditures for ICBM base construction will account for a larger chunk of the military construction budget in the new year. Total military construction spending is slated to decline slightly from the present $1.3-billion level, reflecting the drop in new contract awards during fiscal 1960.

Under present ICBM schedules for 14 Titan and 13 Atlas squadrons, no new construction sites will be selected for the two missiles.

Construction of installations for the final seven Atlas squadrons is scheduled for completion during 1961. Construction of the first three Titan I bases is also set for completion during the year—two squadrons at Lowry AFB, Denver, Colo., and one at Ellsworth AFB, Rapid City, S. D.

Construction of four Titan II missile bases—each housing two squadrons—will begin this year at a cost of about $80 million apiece. Work will continue on three other Titan I bases scheduled for completion in 1962.

Work is delayed on the first Minuteman base in the area of Malstrom AFB, Great Falls, Mont. (see p. 28). So far Malstrom is the only fixed site selected for construction.

VI. Labor

At least two important labor legislation bills are expected to score in the 87th Congress—perhaps early. They are: Raising the federal minimum wage; and amending Taft-Hartley to ease curbs on construction site picketing. Both were stymied these last four years by a coalition of conservative Democrats and Republicans.

The opposition will still be present and active in the new Congress. However, union lobbyists believe they now have the reserve strength to be successful. They have three strikes to throw at the opposition: (1) President-elect Kennedy, who, as a senator, actively promoted both pieces of legislation; (2) Labor Secretary designate Arthur Goldberg who, as a leading AFL-CIO attorney, has been a prominent force on Capitol Hill; and (3) labor committees in the Senate and House heavily weighted with liberals.

Just the change in the leadership of the House Labor Committee will remove an effective bottleneck. Under the retired Graham Barden of North Carolina, the House Labor Committee effectively stalled past labor legislative efforts. But Barden is being replaced by Adam Clayton Powell (D., N.Y.) who will promote labor's demands. On the Senate side, Wayne Morse (D., Ore.) will push legislation through his Senate labor subcommittee.

The first labor bill to be approved will probably be a hike in the minimum wage to an immediate $1.15, and possibly a further deferred increase to $1.25. Retail and service trades will be brought under the law for the first time—that category may well include construction workers not now covered.

The situs picketing bill will be tougher to pass, but if the White House gets behind the measure early in the session, Congress can be expected to pass a bill that would allow craft unions to picket multi-employer construction sites, and not just those contractors with whom they have a dispute.

Despite their optimism, AFL-CIO leaders aren't letting down their campaigns. The AFL-CIO Executive Council meets early in January to lay down its demands publicly; the federation's Building Trades Department plans another massive lobbying meeting of 3,000 craft union officials early in March to put pressure on Congress.

Another top legislative target is the Landrum-Griffin laws. Union leaders are straining at some of the law's restrictions on union internal practices, as well as its picketing and organizing curbs. Their chances here, however, are not too good. President-elect Kennedy has not indicated he'll favor immediate action against Landrum Griffin, even though he opposed some of its tougher rules in Congress. The Administration position will probably depend on Mr. Goldberg, in the Labor department and he may well want to take a long look at the law before he moves against some of its provisions.

There will be no broad revisions, such as prohibiting states to outlaw union shop agreements. The Kennedy Administration doesn't want to become embroiled in another major labor legislative battle right away.

VII. Foreign Aid

The problems and goals of the foreign economic aid program aims at a rapid speedup in the rate of economic growth in underdeveloped countries. This in turn implies a much faster rate of construction of all kinds abroad.

The amount of investment needed in underdeveloped areas to begin to close the income gap is staggering according to calculations now being made by Administration officials.

It is clear too that any such increases in western development programs would pose tough political problems.

So, the Kennedy Administration will ask for only a moderate increase of between $750 million and $1 billion in economic aid next year, and probably not much more in the following year.

None-the-less, the boldness of the new thinking about the development problem indicates that the flow of investment into the underdeveloped countries is likely to increase sharply in the years ahead.

A lot of that investment, too, is bound to go into projects involving large amounts of construction. One area to watch is big new regional river development programs in Africa.

Getting $4 billion or more for foreign aid, and authority to project programs on a long-term basis, will take all of Mr. Kennedy's persuasion and political strength. Even though he has a Democratic and friendly Congress to deal with in his first year. Many leaders in the House and Senate who are wary of any revolutionary changes in aid. In fact, getting a program of any dimensions through Congress has become more difficult with every passing year.

Competition from new industrial nations, the drain on U. S. gold, and tariff problems mount up to an impressive obstacle.

VIII. School Construction

Passage of a school construction bill appears virtually certain.

Both houses passed one last year despite Administration opposition and the threat of a veto. Mr. Kennedy will probably propose an amount somewhere between the respective amounts approved last year: $917 million each year for two years by the Senate; $325 million for each of four years by the House.

For the record, Mr. Kennedy will propose an option for the states to use the money for teachers' salaries. But House Speaker Sam Rayburn, and probably a majority of the House, are strongly opposed to this as a possible entree for federal interference in education. Congress will undoubtedly pass a straight school construction bill and Mr. Kennedy will sign it gladly.

IX. Airports

Sen. A. S. Mike Monroney, chairman of the Senate aviation subcommittee, will introduce legislation calling for a $100-million program of federal aid for airport construction to be matched locally.

It stands a good chance of winning approval with these three factors working in its favor: Mr. Kennedy's desire to spur the economy with increased public works spending; the need for bigger airports to handle the steadily increasing number of jetliners; and congressional concern over air collisions above metropolitan areas.

The collision menace at airports in or close to major cities was highlighted last month when two airliners collided over New York City, killing 134.

The collison added force to the argument of some aviation experts that there should be more airports, more widely separated and located at greater distances—50 to 70 miles—from urban areas. The purpose: to keep airliners bound for separate airports a safer distance apart and to remove the necessity of "stacking" planes over populated centers in bad weather.

Senator Monroney already has endorsed the idea of airport dispersal. New York, Chicago, Los Angeles, Miami, Washington, Atlanta and Kansas City particularly need such a program, he says. He believes the cost of dispersal could be greatly reduced by selling existing airport land in congested areas for industrial development or housing subdivisions.

Advocates of a dispersal program expect strong opposition from those objecting to long commutes from airports into cities. But they say limited access highways, monorails or rapid transit trains would speed the trip.

Kennedy Calls for Whitton

After working 40 years for the same organization, most men are content to wait out their retirement and deal with problems that come their way as a matter of course.

But 62-year-old Rex M. Whitton will leave his post as chief highway engineer of Missouri this month to take on the biggest job in his field, running the Bureau of Public Roads and the gigantic Interstate highway program.

President-elect John F. Kennedy appointed him to succeed Bertram D. Tallamy as Federal Highway Administrator.

"Mr. Whitton's long background in every phase of highway work will place the direction of the nation's important highway program in the hands of a man of unmatched experience," said Mr. Kennedy in announcing the appointment.

The experience the President-elect referred to began in 1920, eight days after Mr. Whitton graduated from the University of Missouri with a Bachelor of Science Degree in Civil Engineering. He joined the Missouri State Highway Commission then as an instrument man, and he's been with it ever since.

He got a well-rounded background in highway work in the department. From the time he entered he has served as assistant resident engineer, resident engineer, chief of survey party, plans designer, assistant district engineer in charge of survey and plans, assistant engineer in charge of construction, construction engineer, engineer on special assignments in surveys and plans and district engineer. For the 15 years prior to his promotion to chief engineer in 1951, he was engineer of maintenance.

As chief engineer he's been responsible for the location, design, construction and maintenance of a system of highways requiring an annual expenditure of more than $175 million.

As Federal Highway Administrator, Mr. Whitton will be responsible for planning, disbursing funds and supervising construction for the 41,000-mile, $41-billion Interstate highway program.

"I think it's a great challenge and I hope I can rise to it," said the soft-spoken, 62-year-old engineer. "I hate to leave Missouri, but Governor Hodges told me it was my duty."

(Gov. Luther Hodges of North Carolina will be Secretary of Commerce in the Kennedy Administration and BPR will be part of his department.)

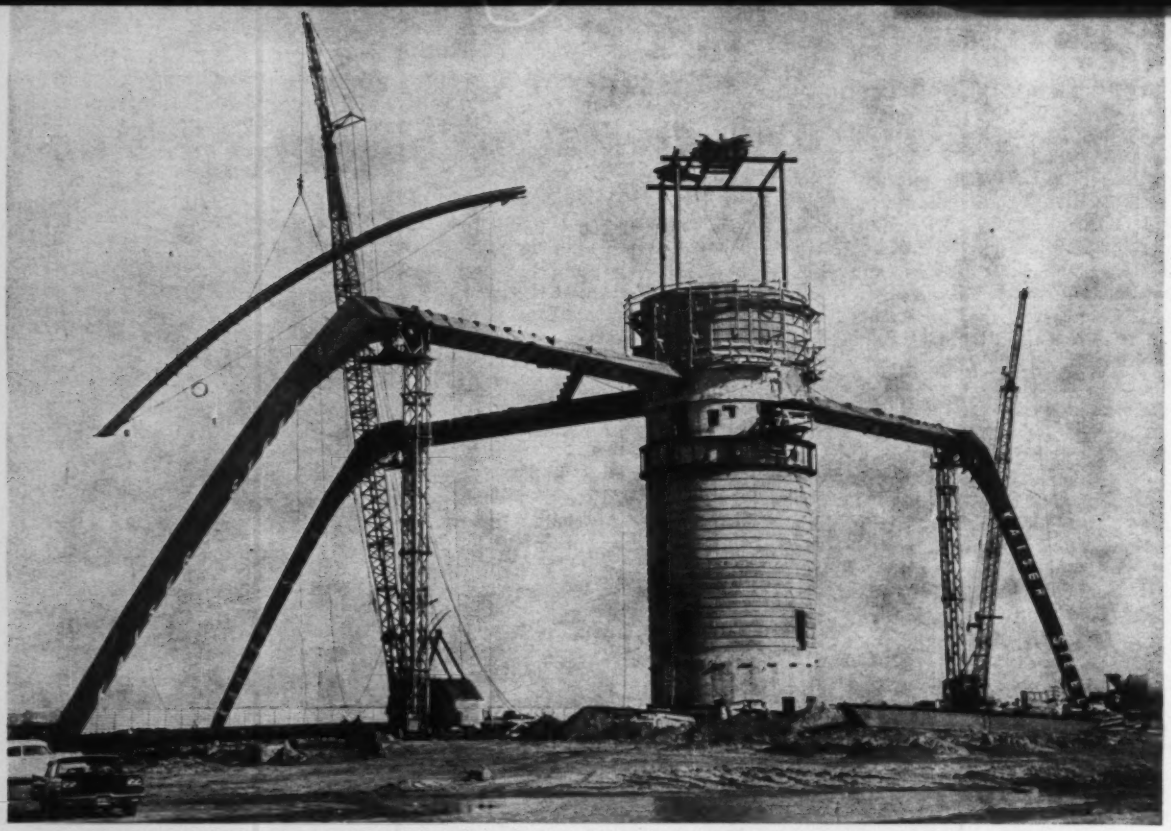
In the nine years that Mr. Whitton has served as chief engineer, Missouri's road system has grown by 12,000 miles. Because of his department's advance planning, Interstate highway projects in Missouri were among the first in the country to get under way.

He has won nation-wide recognition for his work in Missouri. In 1958 he received the George S. Bartlett Award for "outstanding contributions to highway progress." The award is made jointly by the American Association of State Highway Officials, the American Road Builders Association, and the Highway Research Board.

At the annual AASHO meeting in Detroit last month the organization presented the Thomas H. MacDonald Award to Mr. Whitton for "continuous outstanding service." He is the first man ever to win both the Bartlett and the MacDonald awards. Also in 1960, the American Public Works Association cited him as one of the nation's 10 top men in public works.

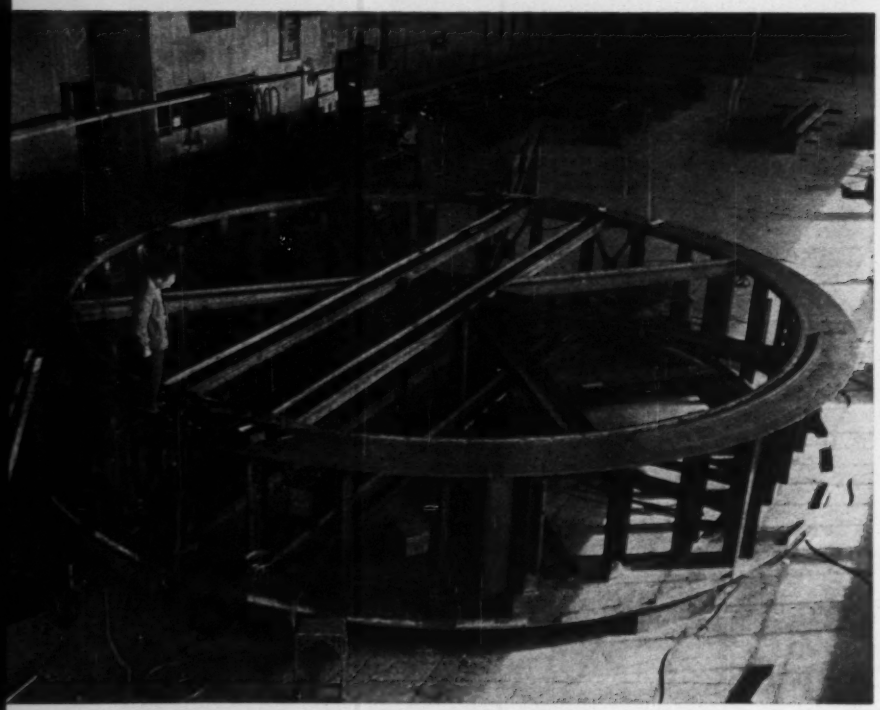
Mr. Whitton served as president of AASHO in 1956, and he has been a member of the executive committee for several years. He is a past chairman of the Highway Research Board and presently a member of its executive committee.

In Mr. Whitton's 40 years with the Missouri State Highway Commission his salary rose from $80 a month to $18,500 a year. When he moves into the office of the Federal Highway Administrator at 1717 H St., N.W., in Washington, it will be $20,000 a year.



Bare steel arches vault over airport's Theme Building in 340-ft intersecting spans.

Spidery Span Sets Theme for L.A.'s



Giant ring supports cantilevered girders for restaurant.

Erection of the structural steel arches for the futuristic Theme Building in Los Angeles International Airport's $50-million jet terminal (ENR Oct. 29, 1959, p. 24) was completed last month.

The Theme Building features two intersecting parabolic arches spanning 340 ft and rising 135 ft at their apex.

The bare steel arches will help to support the roof framing over a glass-walled restaurant 70 ft above grade.

Two cranes erected the arches in two stages: First, the heavy lower sections with the horizontal legs framing to a central reinforced concrete tower; second, the slender upper sections welded to a central apex weldment temporarily supported on a steel falsework frame. Three slender steel falsework towers, 80 ft high, facilitated arch construction.

Total weight of the steel in the arches was 350 tons, including four diamond-shaped lower sections measuring 107 ft and weighing 39 tons each.

The cylindrical central tower measures 34 ft in diameter and rises 90 ft above ground level. Steel girders, tapering from 6-ft to 2-ft depth at their ends, will cantilever radially 35 ft from a steel tension-compression ring to support the restaurant floor (see photo).

Theme Building will house a restaurant 70 ft above grade.

New Jet Airport

Steel trusses cantilevering off a steel strut between the arch sections will support the restaurant roof. Above this level, at the top of the central core shaft, is an observation roof deck.

Four high-speed elevators serve the restaurant. The architects had to design two intertwining stairs occupying the same stairwell in the core to satisfy local fire code requirements.

The structural engineers designed the concrete tower to resist all lateral loads—seismic and wind. The foundation mat is a huge concrete disk, 6 ft deep and 66 ft in diameter. It is supported on 200 concrete piles driven by Raymond Concrete Pile Co., New York City.

Arch legs are tied at their bases with 4½-in.-dia upset rods encased in concrete underground. Tie rods are anchored at their mid-length by the weight of the central tower.

An off-white sprayed vinyl plastic coating will cover both the steel and concrete surfaces of the Theme Building. The 40-mil plastic thickness will conceal surface irregularities caused by wood grain imprints and other form marks on the concrete and welded joints in the steel.

The plastic coating will also waterproof the structure. The material is supposed to be sufficiently flexible and elastic to accommodate the expansion and contraction in the structure without cracking or wrinkling.

The vinyl should require no maintenance for eight to 10 years, according to the manufacturer, Union Carbide Plastics Co. A thin refresher application should renew its service life for a similar period.

A low circular building at ground level will house retail shops and offices. It should be in operation by 1961; the restaurant should open somewhat later. Twelve major buildings in the terminal are either completed or under construction.

Three A-E firms are associated on the $2.2-million Theme Building: Charles Luckman Associates, Welton Becket & Associates and Paul R. Williams & Associates. Structural engineers are Richard R. Bradshaw, Inc., and Stephen B. Barnes & Associates.

Robert E. McKee General Contractor, Inc., is the builder. Joint subcontractors on fabrication and erection of the Theme Building steel are Vinnell Steel and Kaiser Steel Corp.

All the above firms are from Los Angeles.

High Ride to Fair

Seattle's Century 21 Corp. signs monorail contract

Promoters of Seattle's Century 21 Exposition have signed a contract with Alwac International, Inc. of Stockholm for installation of the first permanent mass transit monorail system in the U. S.

The 1.1-mile, $4.2-million monorail will link Seattle's central business district with the 1962 Century 21 international fair (ENR Oct. 27, 1960, p. 22).

The project will consist of two trains of four cars each. Each train will ride on rubber tires on a single reinforced concrete rail. The trains will have dual controls and each will stay on its own track, so switching will be unnecessary. Single piers, plus a few double piers, will support the elevated line.

Alweg Rapid Transit Systems of Washington, Inc., an Alwac subsidiary, is expected to give a subcontract to Howard S. Wright Construction Co., Seattle, for construction of the reinforced concrete support structures and the terminals.

The monorail trains, electrically powered, are slated to carry passengers between downtown Seattle and the exposition grounds in 96 seconds. The two four-car trains will have a capacity of 8,000 persons per hour.

Alwac, the monorail operator, will receive all fares plus 25 cents from each admission ticket.

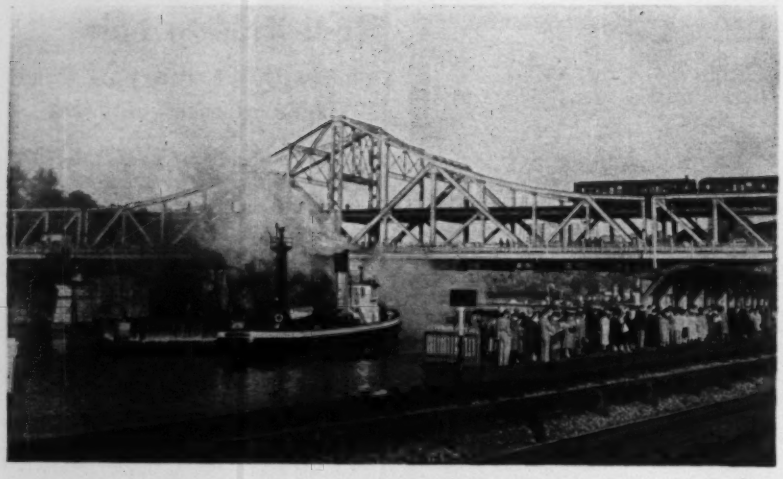
Valuable Connections Due For the Bridge to Nowhere

After six years of battling with the Bureau of Public Roads, Pittsburgh has won approval for $100 million worth of expressways for its lower belt system, which means approaches for one end of its "bridge to nowhere."

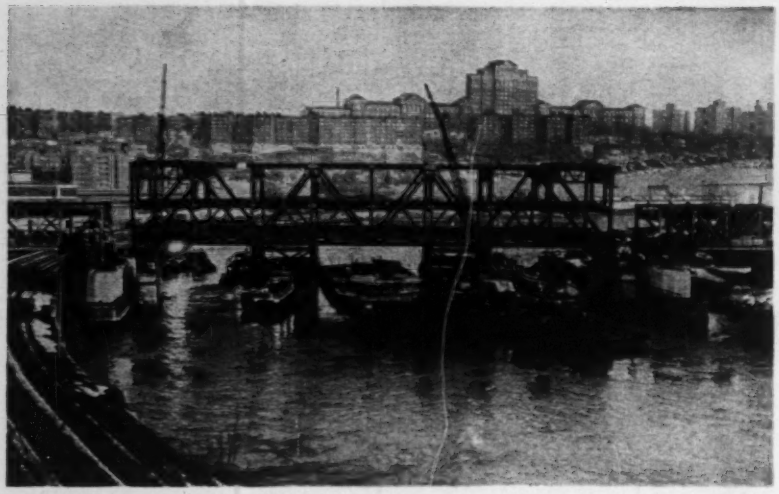
The Fort Duquesne Bridge, a 750-ft tied arch span over the Allegheny River at Pittsburgh's Point, has been all built up with no place to go since late summer (ENR Nov. 10, 1960, p. 34).

Because of controversy over the expressway location, the bridge lacked approaches at its north end. Long-standing arguments over the fate of trolley tracks at the Point hold up acquisition of land for approaches at the south end.

Park Martin, Pennsylvania Secretary of Highways, announced his hopes to get started "in about a year" on ramps for the north end of the double-deck Fort Duquesne Bridge. He said also that a ruling on the trolley tracks is expected in January and his department has contracts ready to award for work on southern approaches.



55-Year-Old Swing Span . . .



. . . Is Replaced by Vertical Lift

History repeated itself early last week when the American Bridge Division of United States Steel played a serious game of musical chairs with two spans across the Harlem River Ship Canal near the northern tip of Manhattan.

The job: Removing and floating away a 265-ft-long double-deck swing span, and replacing it with a 304-ft double-deck vertical lift span.

The location, the operation and the old span itself were well known to American Bridge—the company fabricated the old structure in its Pencoid plant in Philadelphia in 1904, assembled it on barges in the Harlem River in 1905 and floated it into location that same year as a replacement for a single-deck span. (The single-deck bridge, then about 20 years old, was floated down the river and re-erected at 207th St., where it is still in operation after almost 80 years of service.)

Although preparations for the newest span transfer have been going on for months, the actual switching operation was started on December 23 and was scheduled for completion on Christmas day. Short daylight hours, unusually low high tides, near zero weather and high winds hindered workmen, caused them to lose two high tides and delayed the completion of the new span placement by 24 hours.

The new span, like the old, will carry three sets of tracks on its upper level. But where the old structure carried only three lanes of vehicular traffic on its lower deck, the new bridge will carry six. It measures 80 ft c-c of trusses, 47 ft 4 in. c-c chords, and weighs 2,500 tons. It was designed by Tippetts-Abbett-McCarthy-Stratton of New York City for the Department of Public Works of the City of New York.

A contract already awarded for construction of the lift towers will bring the project cost to $12.9 million.

Delaware Troubles

Chief engineer relieved after critical report

A blistering 161-page report by Delaware Attorney General Januar D. Bove, Jr., has put the State Highway Department in enough hot water to float Chief Engineer Richard A. Haber away from his desk on a leave of absence with pay.

The report, which followed an investigation, accuses highway department personnel of "actual commission of crimes, illegal spending of public money, and general moral laxity" (ENR Dec. 22, 1960, p. 33).

It charges that Delaware missed out on an extra $7 million in federal funds because state officials mismanaged federal aid, and alleges that some $2 million "may have been improperly diverted" on 35 highway projects.

Mr. Haber's leave of absence is a direct result of the report. Deputy Chief Engineer William J. Miller, Jr., has been named Acting Chief Engineer.

Also as a result of the report, the Highway Commision has ordered department personnel not to accept gifts or money in excess of $10 from any individual or firm doing business with the department, under penalty of immediate discharge. Contractors, materials suppliers and others were enjoined from making such gifts under threat of disqualification.

The commission has also appointed a bi-partisan committee to draft these further proposed reforms:

- Prohibit highway commissioners and employees from soliciting political contributions of any kind.
- Force strict compliance with state bidding regulations.
- Bar conflicts of interest.
- Implement revision of internal controls over handling of cash receipts and disbursements.
- Tighten controls on purchasing procedures.
- Require immediate reporting of disallowance or rejection of participation by the Bureau of Public Roads on federal-aid projects.
- Tighten controls over work on private properties.

The Bureau of Public Roads is studying Delaware operations. One section of the Bove report states: "In many instances (BPR) has refused to participate in certain payments to contractors. . . . These instances seem to have recurred with certain favorite contractors in iterms which are difficult, if not impossible, to trace."

Staff members of the Blatnik committee have also expressed an interest on goings-on in Delaware.

67 mighty good reasons for investing in an automatic, **steel pipe** fire protection system

The 67 people in this photograph may not think about it, but they can shop with the assurance that a raging fire will not suddenly engulf the store. That's because in most of the nation's 11,494 department stores, even as in the one above, automatic *steel pipe* fire protection systems safeguard lives and property. In fact, wherever there is progressive management—be it in business or industry—there you will find fire prevention systems protecting the public, employees, property, goods.

A *steel pipe* fire protection system is a worthwhile investment. It offers security and pays for itself in a few years through lower insurance rates on buildings, equipment and inventory.

In fire protection systems, as in heating, plumbing, refrigeration and air-conditioning systems—*steel pipe* is first choice. Its high strength, ease of forming and joining and durability make it the optimum tubular product for conveying air, water, liquids and gases. With all these advantages, plus low cost—no wonder more tons of *steel pipe* are produced for more uses than any other tubular product in the nation.

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Green Light for Atoka Water Project

Oklahoma City's $65-million Atoka water project is, at last, about to become a reality. After months of legal jousting, the Oklahoma Supreme Court has cleared the path to construction by approving the controversial agency that is managing the city's water system.

A $62.7-million bond issue was sold almost immediately after the court decision, and a $49.5-million contract was awarded to a joint venture of Lock Joint Pipe Co., and Okatoka Construction Co. even before the court approved the agency.

This is the second contract award in less than a year for construction of the project, which involves a 98.9-mile, 60-in. prestressed concrete imbedded cylinder pipeline, a 100,000-acre-ft terminal reservoir, and some connecting lines to tie the reservoir into the city system.

The first contract was awarded last spring when the city accepted a package offer by the Atoka Water Contractors Co., Oklahoma City, to construct a 48-in. pipeline, a 100,000-acre-ft reservoir, pump stations and a filter plant at a cost of $53.5 million.

Under the limited bonding authority cities have under Oklahoma state law, the job was too big for Oklahoma City to handle the usual way. Therefore the city assigned the operation of its water system to the Oklahoma City Development Trust, a city agency which operates certain other facilities.

This arrangement touched off nearly nine months of court battles. Main complaints:

- The trust was not required to accept the best construction and financing bids.
- Bidding was not open and competitive.
- The construction proposal was not submitted to popular vote.
- The trust did not take alternate bids on steel pipe required for the aqueduct project.

As a result of the legal controversy, the contract was invalidated and a new four-man agency, the Oklahoma City Municipal Development Authority, was created to manage the city's water system and the proposed new construction. The authority is empowered to raise water rates 50% to retire the 40-year bond issue floated for the Atoka aqueduct and is required to submit construction jobs to open and competitive bidding.

The original contract was canceled when the court proceedings were instituted, but the latest award was made to almost the same group under a different name. The first group was comprised of Tecon Corp., Dallas; Standard Industries, Inc., Tulsa; and four Oklahoma City firms: Metropolitan Paving Co., A. J. Kavanaugh Trust, Gill Construction Co., and Cay, Inc.

The successful bidder this second time around is a joint venture of Lock Joint Pipe Co., East Orange, N. J., and Okatoka Construction Co. The newly-formed Okatoka firm includes all the members of the original Atoka group plus Morrison-Knudsen Co., Inc., Boise, Idaho.

Inclusions in the new contract are modified. Pipeline diameter is 60 in. instead of 48 in., and a 30-mgd treatment plant and pumping stations are eliminated—probably to be let under a separate contract.

Oklahoma City has long looked to the southeastern hills, nearly 100 miles away, as a source of water (ENR May 28, 1959, p. 30). In 1956, voters approved a $13-million water improvement bond issue that included nearly $5 million for Atoka Reservoir and right-of-way for the pipeline and terminal reservoir. The 125,000-acre-ft impoundment was completed in March, 1959.

What Next for Minuteman Bases?

The Pentagon is busy trying to figure out what to do about construction of the first Minuteman ICBM base.

Groundbreaking for the job was set for December 15. But the Corps of Engineers Ballistic Missile Construction Office put off the start because the low bid for the job is too high. On the other hand, CEBMCO wouldn't reject the bids.

The low bid for the work was 55% higher than the Corps of Engineers estimate for the job (ENR Dec. 22, 1960, p. 33).

"About where we go from here, no decision has been made," said Brig. Gen. A. C. Welling, chief of CEBMCO at his Inglewood, Calif., headquarters.

He says that the situation is under consideration "from several angles and several levels," that final word will come from the Pentagon.

Corps of Engineers estimate for construction of 150 underground launching silos at Malmstrom Air Force Base, Great Falls, Mont., was $50 million. Bids from four joint ventures ranged from $78.9 million to a high of $98.5 million.

The two most likely possibilities under consideration by the Department of Defense are:

- Negotiate with the contractors to scale the bids down.
- Scale the job down to the point where bidders will do it at the level of the Engineers estimate.

An official in the Comptroller's Office of the Department of Defense says it may be possible "to reduce construction designs of the base and to get by with fewer long-life facilities and fewer control and communications facilities."

Main reasons for the spread between estimate and bids are:

- Tough schedule—construction supposed to start three days after award of contract and be finished by June, 1962.
- Difficult conditions—labor is scarce and weather is bitter in the neighborhood of the site.
- Performance demands—the contract has new penalty clauses for failure to meet schedules.

Although proceedings have ground to a halt, the Engineers and the Air Force stick to their planned mid-1962 completion date. They argue that their original schedule included a cushion for delays.

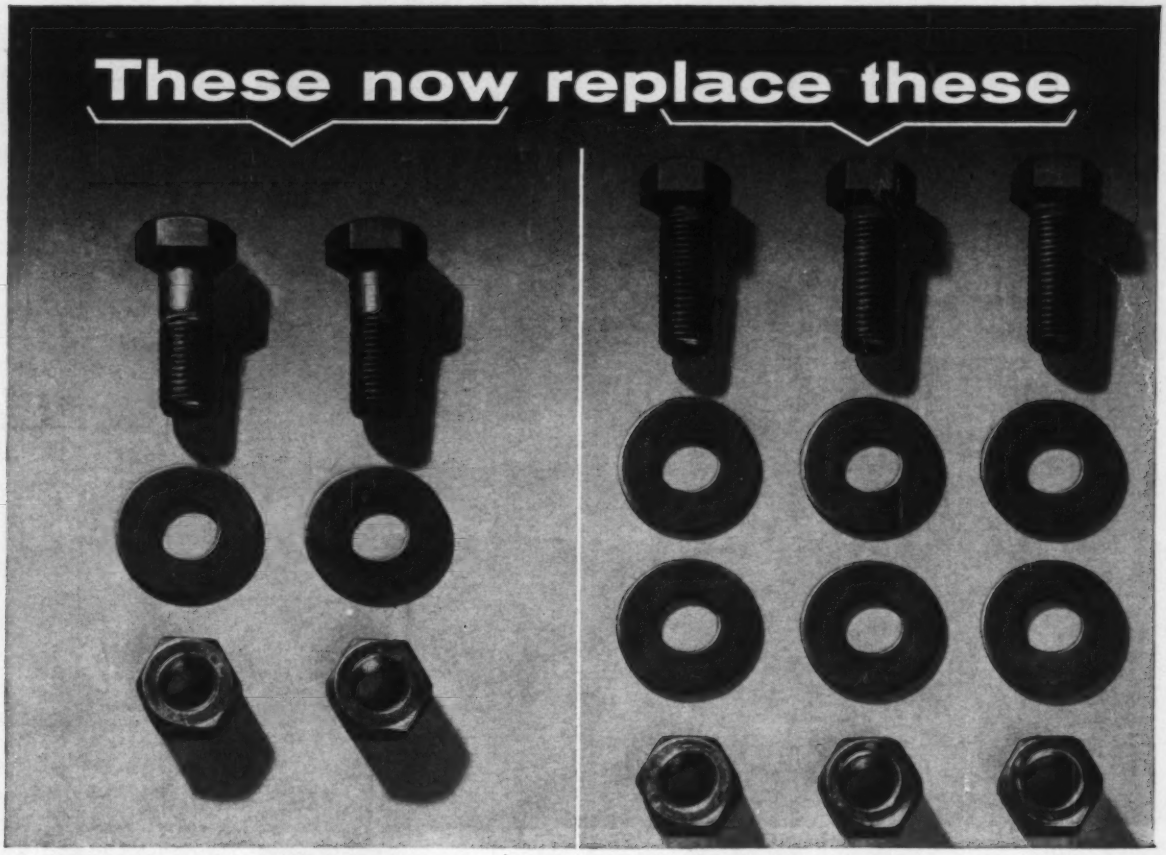
AISC Publishes Two New Standard Specifications

The American Institute of Steel Construction has issued two new standard specifications—a completely new standard for architecturally exposed structural steel and a revised specification for long-span open-web steel joists. (The latter specification was adopted last spring by the AISC and the Steel Joist Institute; it also contains loading tables.)

The trend toward exposed steel led to the more rigid dimensional tolerances and smoother finished surfaces for this type of construction. Among the new requirements are:

- Reduction of the as-fabricated straightness tolerances for exposed structural steel to one-half the standard camber and sweep tolerances in ASTM A-6.
- A limit of 1/16 in. projection of butt and plug weld above the surfaces joined.
- A provision that shop details must show fabrication tolerances and anchor-bolt plans must show required setting tolerances.

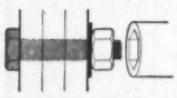
For copies of specifications, write the American Institute of Steel Construction, 101 Park Ave., New York 17, N. Y.



How you can cut structural steel costs with new design RB&W High Strength Bolts

In any type joint, you save one hardened washer out of every two by using RB&W High Strength Bolts with new head and thread design.

But in bearing joints – the majority of all structural steel connections – the savings really soar. For you also eliminate one fastener out of every three formerly required . . . regardless whether they were rivets or regular high strength bolts.



This sketch shows why. The new bolt has shorter thread length. Shear planes pass through full shank section only, thereby enabling the full, allowable shear strength of the bolt to be utilized. The new larger head furnishes extra bearing area to prevent crushing when bolt is torqued up to its full recommended tension. Only one washer is needed . . . under head or nut whichever is rotated in wrenching.

The AISC approves this fastening breakthrough. It has been fully tested and approved by the Research Council on Riveted and Bolted Structural Joints. The sooner that structural engineers work it into their new designs, the sooner everybody benefits. Building owners benefit through lower costs; construction shop fabricators benefit through more tonnage assembled faster with existing shop space; erectors benefit through fewer holes to fill and less material cost.

Consult us for more details on these bolts that have *certified* quality. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

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LARGEST INDEPENDENT PRODUCER OF HIGH STRENGTH BOLTS FOR CONSTRUCTION

Dams: Shihmen, a big rockfill is readied for diversion.

Highways: Expansion includes

Taiwan Builds Toward Self-

If the U.S. Development Loan Fund comes through with a $40.5-million loan, as expected shortly, Formosa will start construction of one of the world's notable concrete arch dams. Not only is it planned to be 780 ft high, but it will be pierced with submerged spillway openings designed to operate under the unheard-of head of 460 ft. And, as its reason for existence, it will feed a 360,000-kw underground power plant as well as release its water for other hydro projects downstream.

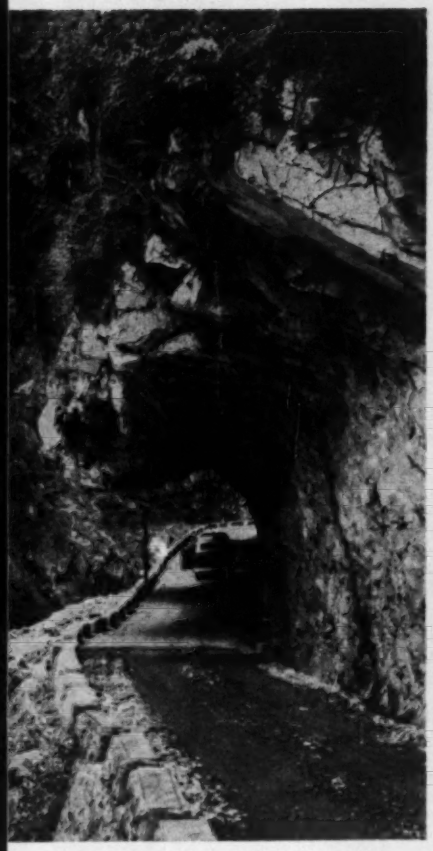
Even without this remarkable structure, however, this 14,000-sq-mile island stronghold, is the scene of large and diverse construction projects. New facilities and others nearing completion are pushing Chiang Kai-shek's country ever nearer to its goal of self-sufficiency. And since Formosa rests on a foundation of massive U.S. aid—nearly $1 billion over the past decade—it is satisfying to hear and see that the work is being done well and economically.

U.S. engineers and government officials connected with our foreign aid operations in a number of other parts of the world say that Taiwan (the name that Nationalist Chinese prefer to call their island) is outstanding in the above respects. They point to a working class that is industrious and imbued with a burning desire to raise its standard of living; to a group of government and business officials built around the cream of Chinese technicians and administrators, since these were the types that fled Communist domination of the mainland; to the fact that the U.S., which needs Taiwan as a military base, has been generous and prompt with aid; and to the fact that Chiang Kai-shek, who exercises dictatorial power, can be quick and decisive in the development and approval of plans.

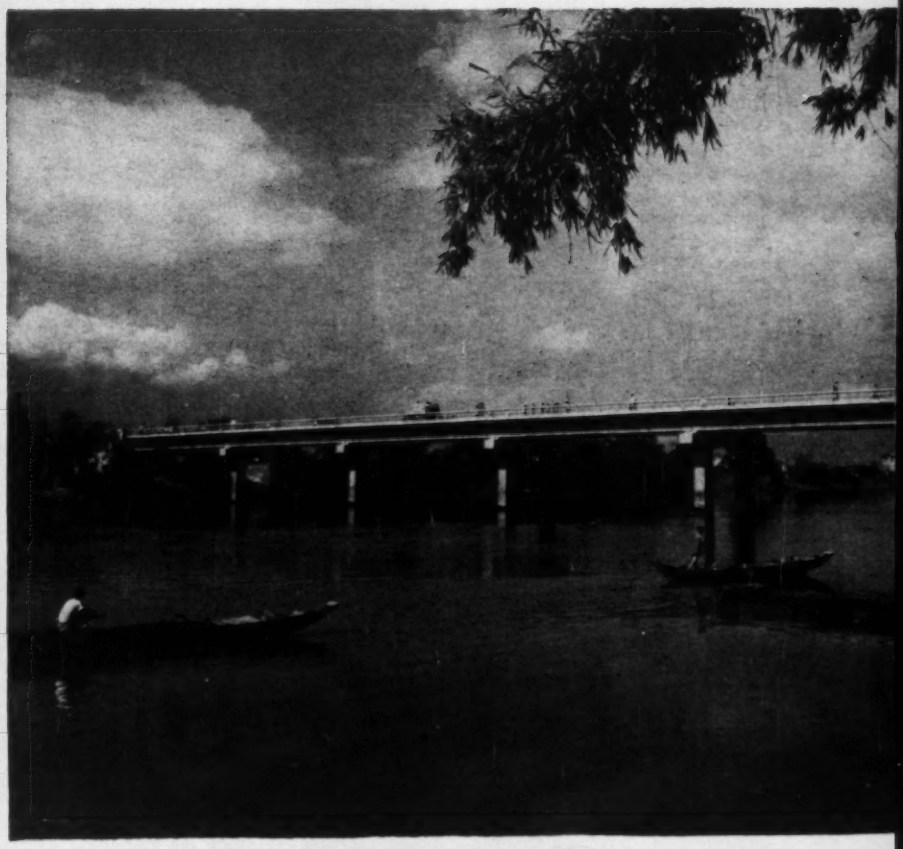
To this framework and the conditions it fosters, Taiwan owes the progress it has made in resettling three million refugee Chinese, assimilating them with the seven million Taiwanese who were residents under the Japanese for half a century up to the end of World War II, and bringing the whole to a condition of near universal prosperity.

If the statistics are correct, U.S. aid, mostly through the International Cooperation Administration, has accounted for nearly a third of the gross capital formation in Taiwan in the past decade —15% in agriculture, 39% in industry and 31% in transportation and communications. This is an investment that has shown results. The rural population is prosperous by Asian standards, and there is enough rice, fish, vegetables and fruit for everyone. There is widespread and growing employment in all kinds of new industrial enterprises—from food processing to pulp and paper, building materials, fertilizer and machinery manufacture. Railroads and highways have been improved and extended, including the building of a 100-mile cross-island road, scraped and tunneled over mountainous terrain. And to top it all off, the country has an electric power system that is a marvel of present usefulness and dynamic growth.

• **Power story typifies progress**—What



100-mile cross island road.

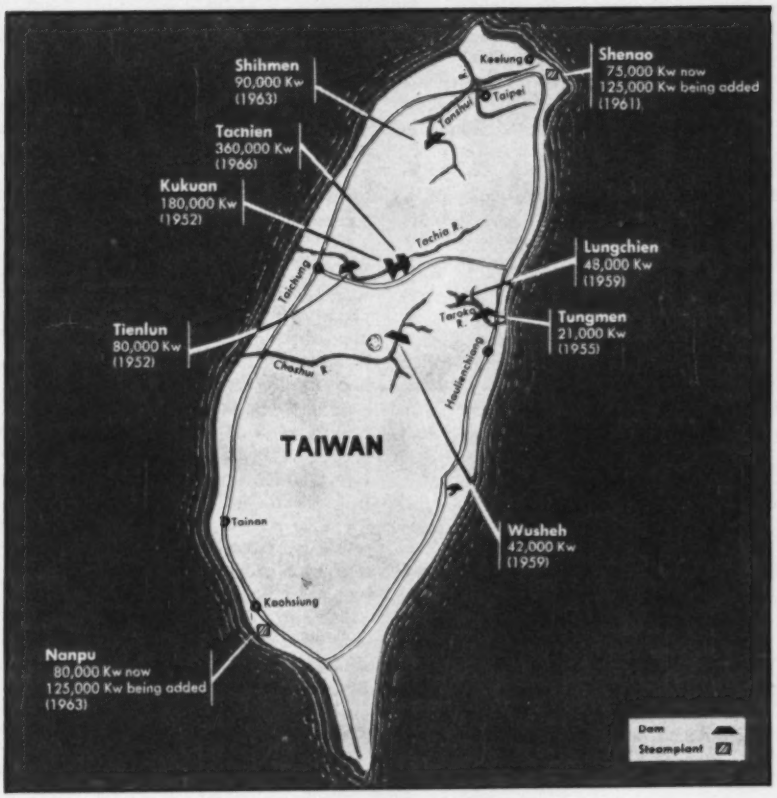


Bridges: Prestressed girders span river near Taipei.

Sufficiency

has happened and is happening in the electric power field, in fact, best epitomizes Taiwan's over-all progress. The responsible agency is the Taiwan Power Co., which has handled all the projects except one. (The exception is Shihmen, a 436-ft-high rockfill dam on one of the most difficult sites, foundation-wise, that dambuilders anywhere are apt to encounter. (Shihmen is in charge of a special development commission because its primary purpose is irrigation rather than power.)

Taipower, as the power agency is called, is almost entirely government owned, but operates in every respect as a private profit-making enterprise. It pays normal taxes, the going rate of interest on its loans from the government (and on the DLF loan when it gets it) and, of course, all operating expenses. Although its rate of 1.09 cents per kwh is the lowest in Asia, Taipower has continually increased its profits, which will reach about $6 million this year. The utility has met an annual increase in power demand of 17% during



Power growth (note dates) epitomizes island's progress.

the past decade. And as a final measure of Taipower success and growth, its power output per capita (and it serves 87% of the population) is 350 kwh, third highest in Asia after Japan and Israel.

• **Construction was the key**—How it got that way is a construction story with many notable aspects. Although the Japanese had built a good economy on Formosa and had 25 hydro and eight thermal plants in operation (321,000 kw total capacity and a combined peak load of 177,000 kw), the entire system was left in a shambles. When Taipower took over, the system could carry a load of only 33,000 kw.

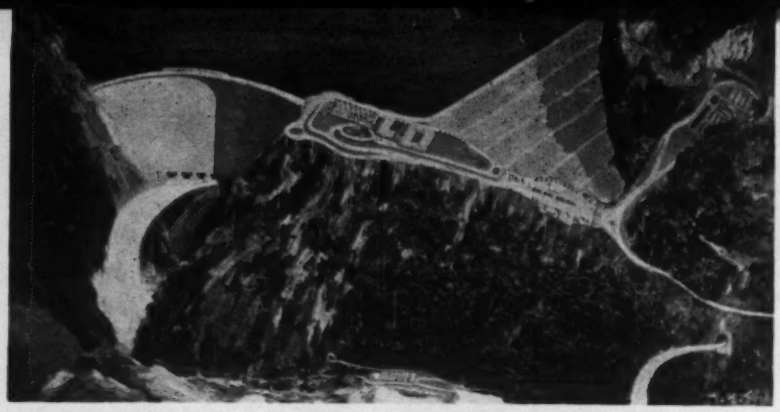
Rehabilitation, with no outside help and makeshift methods, got the capability back up to the 177,000 kw by 1951, about five years' time.

Since then, with U. S. aid beginning in 1953, expansion has been enormous, and the present peak load is 633,000 kw. Present capacity is 708,000 kw, of which 448,000 kw is in 26 hydro plants and 260,000 kw in nine steam stations.

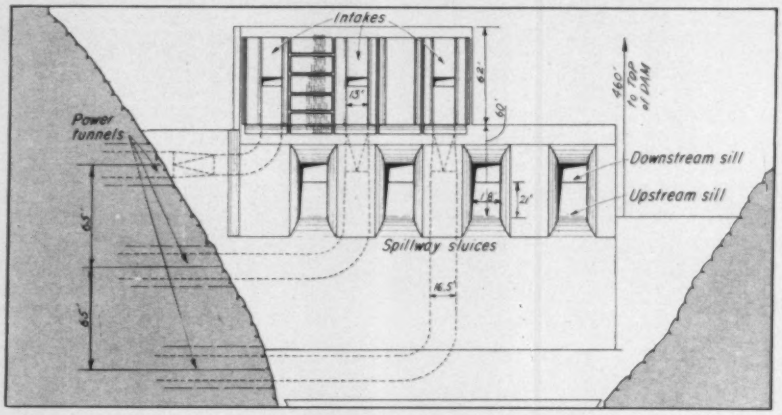
One of the important milestones on the way was construction of an east-west tie line across the country from the flat, fertile, well populated plains of the west coast into the mountainous east coast region. A second was doubling the size of the Japanese-built Tienlun plant on the Tachia River to 80,000 kw. In a third difficult construction operation, a new underground power plant was built for the old Tungmen hydro plant on the Taroko River on the east coast. An earlier powerplant on the surface had been completely buried in debris brought down by an earthquake and floods in 1943.

With the experience gained on Tungmen, operations were shifted upstream on the Taroko, where another underground plant, Lungchien, was built to operate under a 2,930-ft head. Finally a major dam—Wusheh—was undertaken on the Choshui River, where two Japanese-built plants already exist, fed from a natural reservoir called Sun Moon Lake. Wusheh is a 300-ft-high concrete gravity dam designed by the U. S. Bureau of Reclamation and completed last year.

• **U. S.-Chinese teamwork**—All of this construction work and design (except for Wusheh) has been done by Taipower's own forces, but it has had the help and guidance of the J. G. White Engineering Co., which has also helped the national government on all of its work. J. G. White has had a contract for nearly 12 years to supply "management advisory and consulting engineering service" to the Republic of China. The firm is paid by ICA but deals with a directorate of Chinese officials known as the Council on U. S. Aid, or CUSA. The company has made feasibility reports, supervised construction in an advisory capacity and aided the government in selecting consultants on large projects. It has operated in all fields—power, industry, transport, mining, shipbuilding and communications, to name the principal ones.



HOW TACHIEN PROJECT WOULD LOOK with 780 ft concrete arch and 6 million cu yd rockfill completed. Spillway jets under full 460 ft head would be 1,070 ft long.



UPSTREAM FACE OF TACHIEN ARCH shows how body of dam will contain power conduits as well as openings for power intakes and spillway sluices.

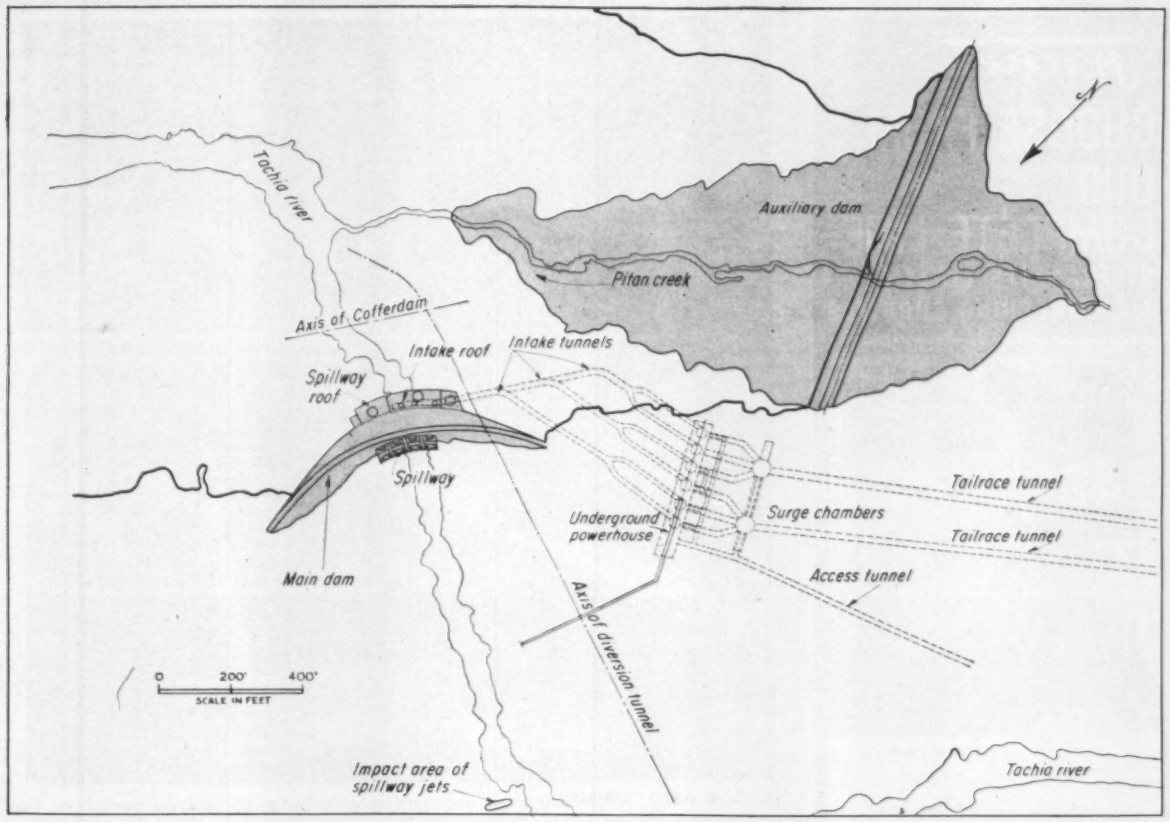
• **Hydro hogs the publicity**—The next additions to Taipower's generating capacity will come in the steam plant field, since it is building large additions to two relatively new thermal stations—one in the north near Taipei, the capital, the other in the industrial south near Kaohsiung.

One of the engineers for Gibbs & Hill, consultants on these stations, ruefully remarked, "Steam generates all of the new power, but hydro gets all the publicity." And he is close to being right, for each of these new additions will add 125,000 kw, and 250,000 kw is, to be sure, 35% of all present capacity. Nevertheless, the great arch dam now about to get underway on the Tachia River and the other plans the company has for this greatest of all of Taiwan's hydro power streams cannot be ignored.

On the Tachia, Taipower's foreseen development will provide 1,384,000 kw (nearly twice the company's present capacity) by the construction of a high concrete arch dam called Tachien, which will provide 400,000 acre-ft of storage to operate six power plants downstream. One of these plants, Tienlun, is in existence, but it will be enlarged. A second plant, Kukuan, is now under construction. It involves a 282-ft arch dam with a submerged spillway, a 21-mile pressure tunnel, and an underground plant with initial capacity of 90,000 kw and an ultimate capacity of 180,000 kw. Of the other four plants, only Tachien is expected to be built during the next five years. In the meantime, however, plans will go ahead to utilize the water released by the power plants on a 100,000-acre irrigation project to be developed along the west coast on either side of the river's mouth.

• **Tachien sets bold precedent**—Tachien Dam was the last important project designed by the late Andre Coyne of France. In many respects it is as bold and precedent-setting as any of the many important ones that came out of his office. His firm of Coyne & Bellier, which also designed Kukuan, will continue to handle the work.

Tachien project will be remark-



TACHIEN PROJECT includes a 780-ft-high concrete arch main dam and a 395-ft-high rockfill auxiliary dam. The underground powerhouse will have six 60,000-kw generating units. Tachien is the last important project of Andre Coyne, who died last year.

able not only because of its high arch and submerged spillway but also because of a 6.1-million-cu yd rockfill dam 395 ft high to isolate the arch dam from bad rock in the left abutement. In the accompanying illustrations of the project, the left abutment may be seen as a relatively narrow ridge forming one bank of a side valley. There is sound rock at the arch dam itself, which will be 780 ft high and 105 ft wide at the base, and also for a considerable distance into this ridge; but as the ridge narrows, weathering and faults make it extremely susceptable to seepage. Hence the scheme to cover this bad rock with an embankment, all of whose upstream face will be submerged by the reservoir.

The bad rock led to the use of a submerged spillway. Had the rock been sound, the simpler solution would have been to build an ordinary chute type spillway on the ridge itself.

The story of Tachien Dam is better told by the accompanying drawings than it can be in words. Nevertheless a few features are worth double emphasis. The submerged spillway will consist of four 18x21-ft openings through the body of the dam. Discharge will be controlled by tainter gates. The openings will be under the unprecedented head of 460 ft when the reservoir is full. Under that head they will discharge 231,000 cfs. The jets are designed to hit the canyon bottom 1,070 ft downstream of the dam—safely beyond the point where any erosion they may cause can affect the dam foundation. They would be operated only under a full reservoir.

The spillways are not the only interruptions to the dam's cross section. Immediately above the spillway openings are three power intakes. From them, the water goes through 16.5-ft-dia conduits cast into the dam between the spillway openings. These conduits are turned at right angles within the dam to come out into pressure tunnels in the left abutment. The tunnels lead to the penstocks feeding the six 60,000-kw generating units in the underground powerhouse.

• **Tachien site is well explored**—Any doubts about the adequacy of the foundations have been resolved by extensive underground exploration. Results of the exploration have been approved by the designer and by an international consulting board composed of Frank Nickell, John Hammond and Paul Baumann of the U. S. and J. Duffaut of France. In the past eight years the Chinese have spent $1.5 million on three miles of tunnels and 1.2 miles of bore holes. The Japanese, who had planned a 725-ft concrete gravity dam at this site, had done considerable exploration and had built an expensive construction road to the site.

Tachien Dam will require 1,280,000 cu yd of concrete. The project is estimated to cost $110 million, of which $53 million is to be borrowed outside the country—$40.5 million from the U. S. Development Loan Fund and $12.5 million elsewhere, perhaps from Japan if negotiations to obtain the turbines and generators from that country on credit are successful.

A final point about Tachien: Taipower plans to depart from its practice of construction by its own forces, and award the construction contract to a U. S. firm.

• **Shihmen a difficult job**—The problems of construction on Tachien Dam are in the future. On Shihmen Dam, the largest construction operation under way in Taiwan, the problems are here and now.

Located about 20 miles southwest of Taipei on Takekan Creek, a tributary of the Tanshui River, Shihmen is the first multipurpose project undertaken

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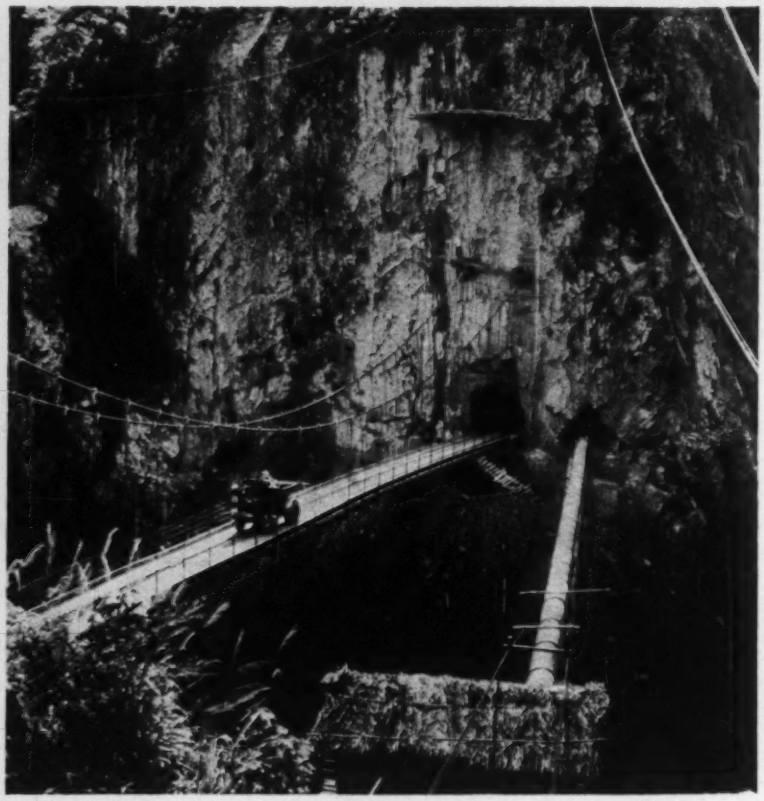


BRIDGE AND TUNNEL lead to underground powerhouse for Kukuan project on the Tachia River. Plant will have initial capacity of 90,000 kw, later will double.

by the Republic of China. The main purpose is irrigation rather than power, and the project also involves flood control and water supply benefits. For these reasons a special agency, the Shihmen Development Commission, was organized to handle it. The commission has engaged Tippetts-Abbett-McCarthy-Stratton, consulting engineers of New York, to design the dam and furnish field inspection, and Morrison-Knudsen International Constructors, Inc., Boise, Idaho, to direct and administer the construction, which is being done force account under the Commission's own staff. The TAMS operations are under the direction of Donald H. McCoskey, whose last job for the firm was interrupted by the revolution in Iraq. Glenn C. Johnson is project manager for M-K.

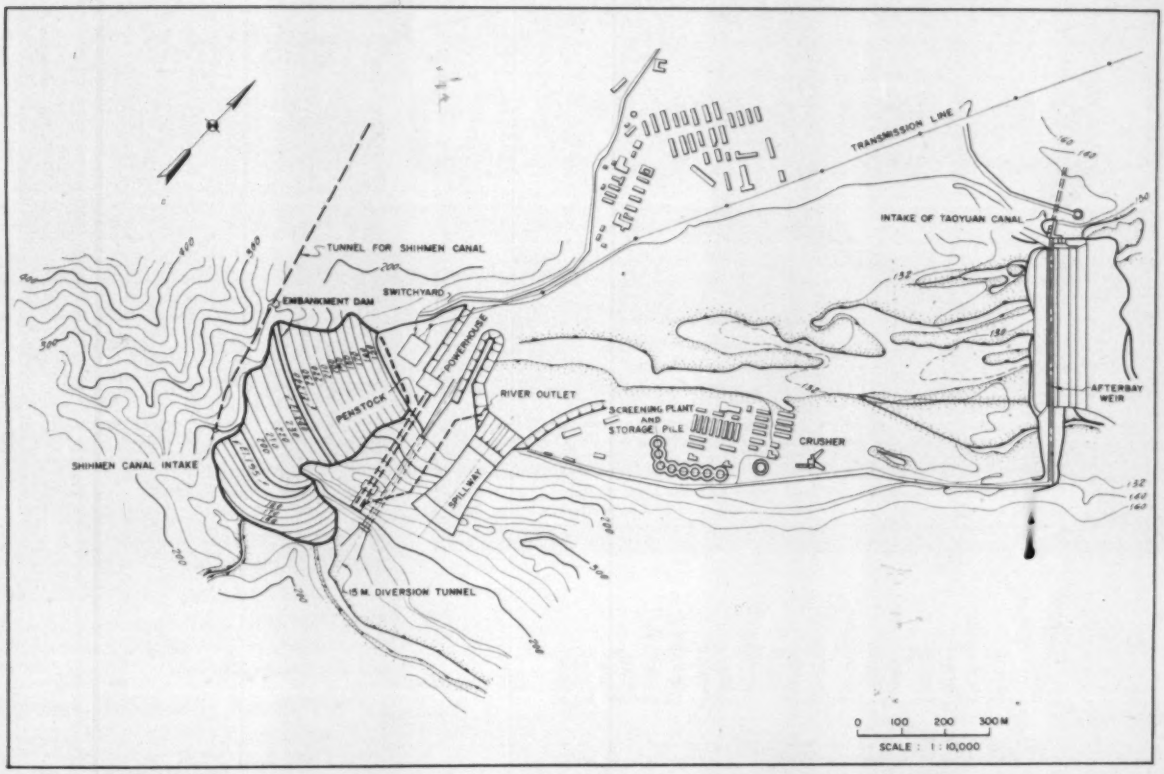
Shihmen, which will be a 436-ft-high rockfill of 8,890,000 cu yd, is particularly notable because of bad foundation conditions uncovered in the right abutment, where the spillway, diversion tunnel and power tunnels must be placed. By coincidence the topography of this right abutment bears some resemblance to the left abutment at Tachien—a long narrow ridge that will form one bank of the reservoir. Takekan Creek bends sharply amound the end of this ridge, and it is in this bend that the rockfill will be placed.

• **Bad rock caused design change**—The Chinese had planned a concrete arch dam for the site hoping to use the project as a training ground for Tachien.

They had also driven the 49.5-ft-dia diversion tunnel through the right abutment by the time the TAMS firm was engaged as consultant. On the basis of the rock condition in this tunnel and in several subsequently driven adits, TAMS reported that it would be dangerous to locate an arch on the site. Last April TAMS recommended switching to a rockfill with a clay core.

The abutment rock is characterized as a "dirty sandstone." It contains a number of intersecting shear zones, and sound rock is frequently interrupted by rather wide mud seams. Even for a rockfill, a tremendous amount of dental work will be required, particularly in the right abutment, where the spillway and power tunnels are located.

• **Jobsite is humming now**—Good fill material is available nearby on the left bank and in the river bed, so preparations for constructing the rockfill are actively under way. About $7 million worth of new equipment, including $1



AT SHIHMEN PROJECT, a labor force of up to 3,500 will build an 8.89-million-cu yd rockfill dam, 90,000-kw powerhouse and irrigation works for Taiwan's first multiple-purpose (water supply also) water resources development.

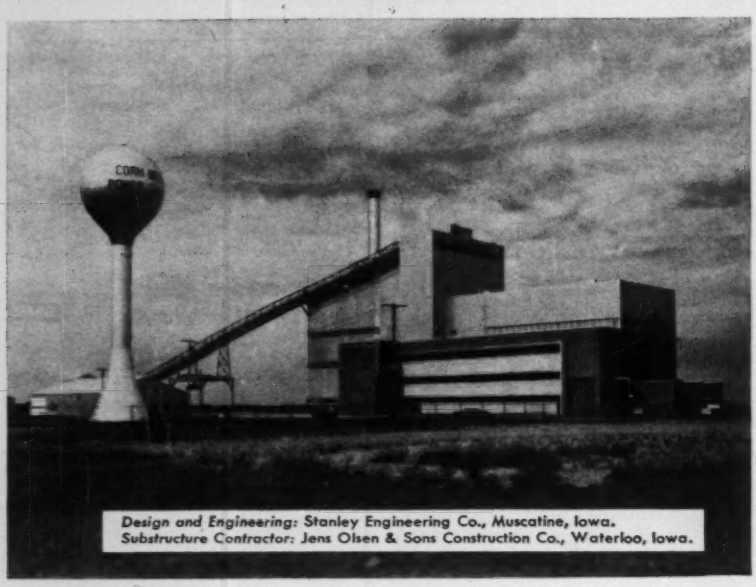
million worth of spare parts, is on the job. At the peak M-K will be directing a labor force of about 3,500 men. Good construction weather in the late fall permitted around-the-clock operations to complete the upstream cofferdam (which will form the upstream toe of the permanent dam). River diversion was achieved December 17.

Meanwhile, work on the spillway and power tunnels is going ahead under equal pressure. The spillway, cut into the top of the right abutment ridge, is designed for a maximum discharge of 385,000 cfs. The spillway represents a major construction task. It is about 340 ft wide at the top converging to 230 ft at the bottom, and over 600 ft long from crest to bucket. Not only must the top 150 ft of the ridge be removed, but a large amount of bad rock must be taken out at the lower end of the chute, and replaced with concrete. Under the bucket, the depth of this concrete will approach 100 ft.

The bad rock and the danger of seepage under the crest of the spillway will also require special measures. Not only will grout curtains be placed there, but a concrete cutoff wall will be sunk into the face of the cliff upstream of the crest to isolate it from any seepage.

The rock condition has also required special measures to protect the outlet ends of the two 15-ft-dia penstock tunnels. These are extended beyond

SHIHMEN SITE before start of construction. Rockfill dam location is river bend in foreground. Reservoir area is right half of photo.



Design and Engineering: Stanley Engineering Co., Muscatine, Iowa.
Substructure Contractor: Jens Olsen & Sons Construction Co., Waterloo, Iowa.

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Vibroflots compacting soil at Spencer, Iowa. About 2½ cu. yd. of sand fill was required for each penetration.

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SHIHMEN SPILLWAY excavation proceeds above outlets of 50-ft-dia diversion tunnel and two penstock tunnels.

the face of the mountainside into a heavy reinforced concrete portal structure, planned to resist movement from any cause, including earthquake. Also, because there is not much extra room for the powerhouse, the face of the mountain has to be left rather steep, and there is the possibility of rock slides.

Earthquake possibilities are also taken into account in the design of the lower end of the penstocks. The tunnels are enlarged at this location, and the penstock pipes are mounted in heavy structural steel cradles to isolate them as much as possible from any foundation movement.

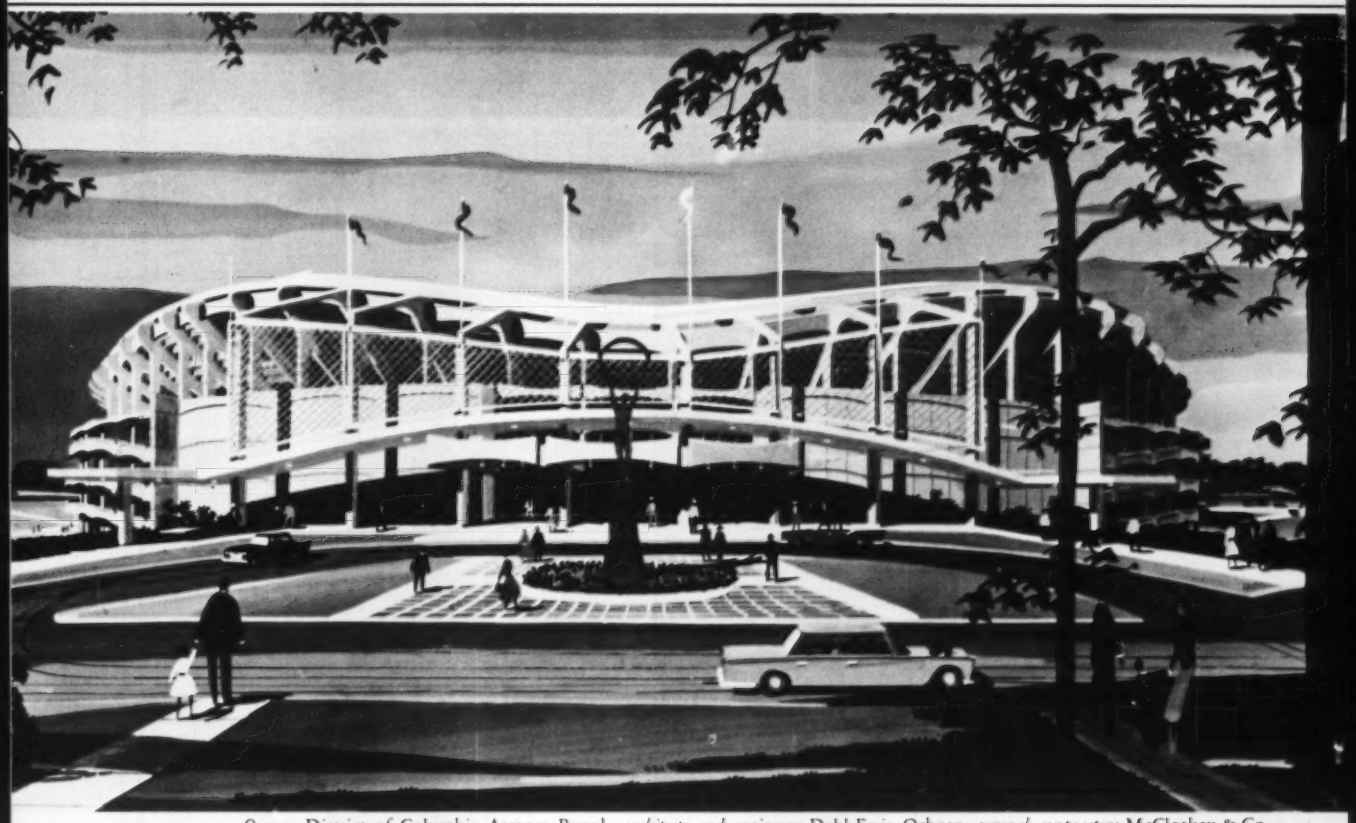
On the accompanying map of the Shihmen project layout, it will be noted that there is a weir about a mile downstream. The 1,550-acre-ft afterbay thus formed will be filled each night when the two 45,000-kw generating units in the power plant are to be operated. During the day power will not be generated, and the afterbay will be drained into the existing Taoyuan irrigation canal through a new inlet structure.

The important new irrigation feature of the project, however, is an entirely new system. It will be fed from a new high-level canal taking off from the reservoir itself via a tunnel through the mountain that forms the left abutment of the dam. This new Shihmen Canal will be 19 miles long and will irrigate 57,000 acres, which can now only be dry-farmed. It will also provide a public water supply to a large area where none now exists. Included in the project is an 8-mgd water treatment plant.

JANUARY 1961

Progress Report on STEEL CONSTRUCTION

BETHLEHEM STEEL COMPANY



Owner: District of Columbia Armory Board; *architects and engineers:* Dahl-Ewin-Osborn; *general contractor:* McCloskey & Co.

The Capital Gets A Remarkable Stadium

The undulating roof line shown in this architectural rendering suggests that here is a stadium not quite like any other. And such is indeed the case. It is unusual in that it is circular in plan, and double-decked all the way around. Although the seats are roofed over, there are no supporting columns to obstruct vision. And about 340 ft of the lower stands are movable in two sections, to accommodate the differing requirements for viewing football and baseball games. Seating capacity for the gridiron sport is approximately 50,000, and 43,500 for baseball games.

The upper decks and roof are supported by pin-mounted welded steel rigid frames of box section. There are 66 of these frames, laterally connected by a combination of box struts and WF rafters, totalling some 7,350 tons of steel. These frames support the seating and roofing on cantilever arms as long as 80 ft!

Most connections will be field welded, and lifts require the use of a stiffleg derrick mounted on a traveler with an 85-ft-high tower, as well as a crawler crane.

The total price tag comes to about $15,000,000 for the structure, plus its landscaping, parking areas, and an access road. It is hoped that the project will be ready for the kick-off of football season—Bethlehem began steel erection this month.

Project development by Atlas Terminals, Inc.; *architect:* Charles Luckman Associates; *structural engineer:* James Ruderman; *associate structural engineer:* Henry Layne; *mechanical engineer:* Cosentini Associates; *general contractor:* Haas & Haynie.

A Whopper for Wilshire

Since the removal of the height limit restrictions, buildings in Los Angeles have edged upward. And this one beats them all—it's the Pacific Tower, 300 ft high, with 26 office floors comprising some 280,000 sq ft of floor area. Upon completion it will be the tallest commercial building in Southern California.

At its base, and emphasizing the dramatic height of the tower, are a four-story office building, a four-story parking structure, and *space*—about 35 per cent of the site area is open to light and air. The handling of this open space and its relationship with the structures around it represent a substantial civic contribution by the owners and designers. They have publicly expressed their hope that the $10-million project, first major new construction on this portion of Wilshire Boulevard, will establish a high standard of public responsibility for others yet to come.

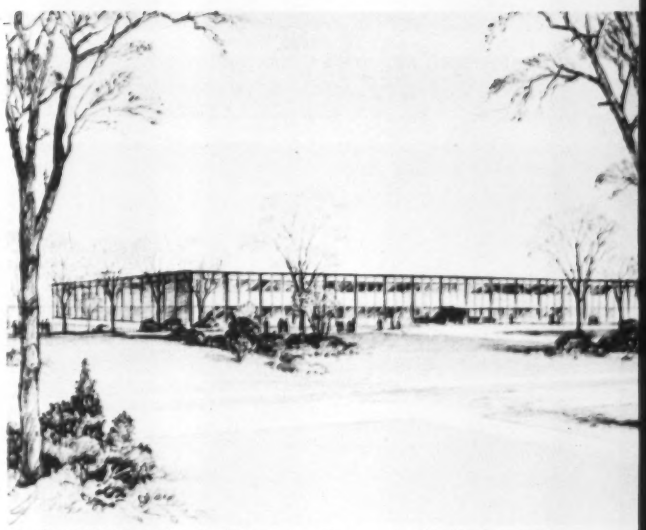
The tower, fronting on Wilshire at McCarthy Vista and Warner Drive, will be framed with about 2,110 tons of structural steel. A steel-framed three-level bridge will connect the tower with the adjoining low-rise office structure. Fabrication of steelwork is being handled at Bethlehem's nearby Torrance Works.

Bethlehem Builds for the Future

With general headquarters virtually bursting at the seams, Bethlehem Steel's office planners looked across the Lehigh River, to the north side of the city, for badly needed office space. There the company is now putting up this handsome, U-shaped office structure, measuring approximately 356 ft by 337 ft in plan. Its two office floors will initially accommodate more than 1,000 employees, including fabricated steel construction, accounting, and records administration personnel. There will be ample space for additional personnel to meet future requirements.

The new facility is planned to be a virtual showplace of construction products made of Bethlehem steel. The framework will be of structural steel, with field-bolted joints. Curtain walls feature porcelain-enameled sheets of Bethnamel, the company's newly developed enameling steel. Floors are poured concrete on cellular steel sub-flooring, while the built-up roof will be applied to steel roof decking.

The view from the $3.5 million-plus building will include the company's tremendous research laboratories complex on the crest of South Mountain, a $25-million investment in basic and applied research and development, and one of the nation's largest privately financed research facilities.



Architect: McKim, Mead & White; *general contractors:* McCloskey & Co.

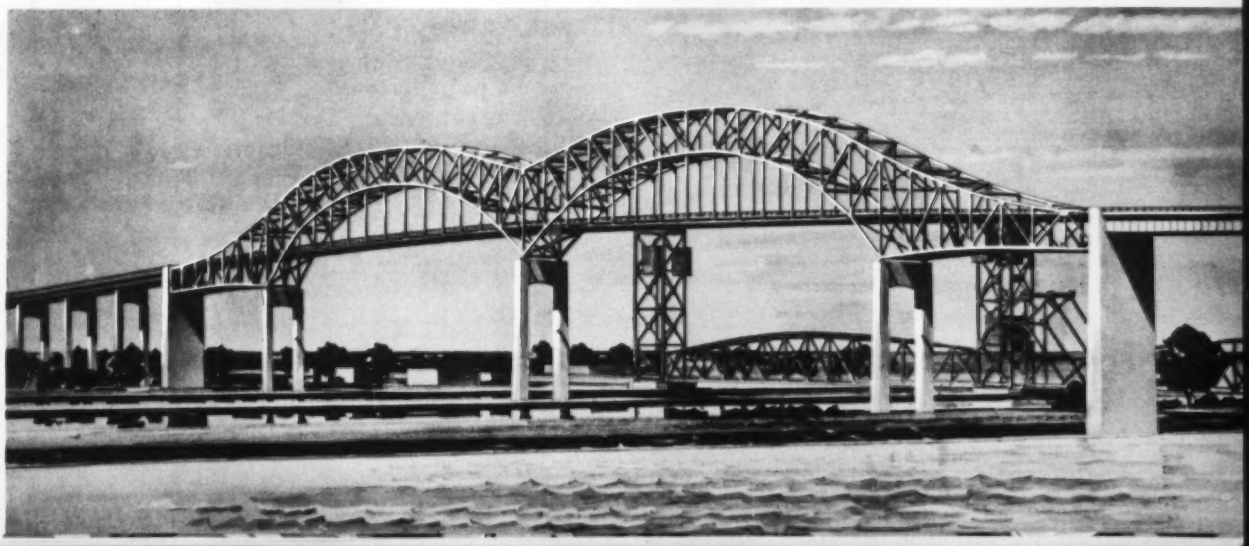
A New International Bridge

Work has begun on a major crossing that will provide another much-needed link between the United States and its good neighbor to the North. The bridge will pick up traffic from Interstate 75, the high-speed highway extending from the Michigan-Ohio boundary northward, across the Straits of Mackinac and into the town of Sault Ste. Marie. On the other side of the border through traffic will proceed into Ontario by King's Highway 17.

The over-all crossing totals 14,595 ft in length, including plazas, and provides a 28-ft, two-lane roadway. It includes a variety of structures. Bethlehem Steel has the superstructure contract for the continuous-truss bridge shown in the rendering, plus adjacent 3-span and 4-span continuous deck-plate-girder units to the north. Total length of the contract is 2,663 ft.

The main bridge, of continuous, double arched-truss design, totals 1,260 ft in length, crossing the American and Canadian Ship Canals with clearance of 124 ft above low water. It has 200-ft end spans, and two 430-ft main spans. Steel required is approximately 3,900 tons.

Owner: The International Bridge Authority of Michigan; *design engineer:* the late D. B. Steinman; *supervision of construction:* Steinman, Boynton, Gronquist & London, Consulting Engineers.



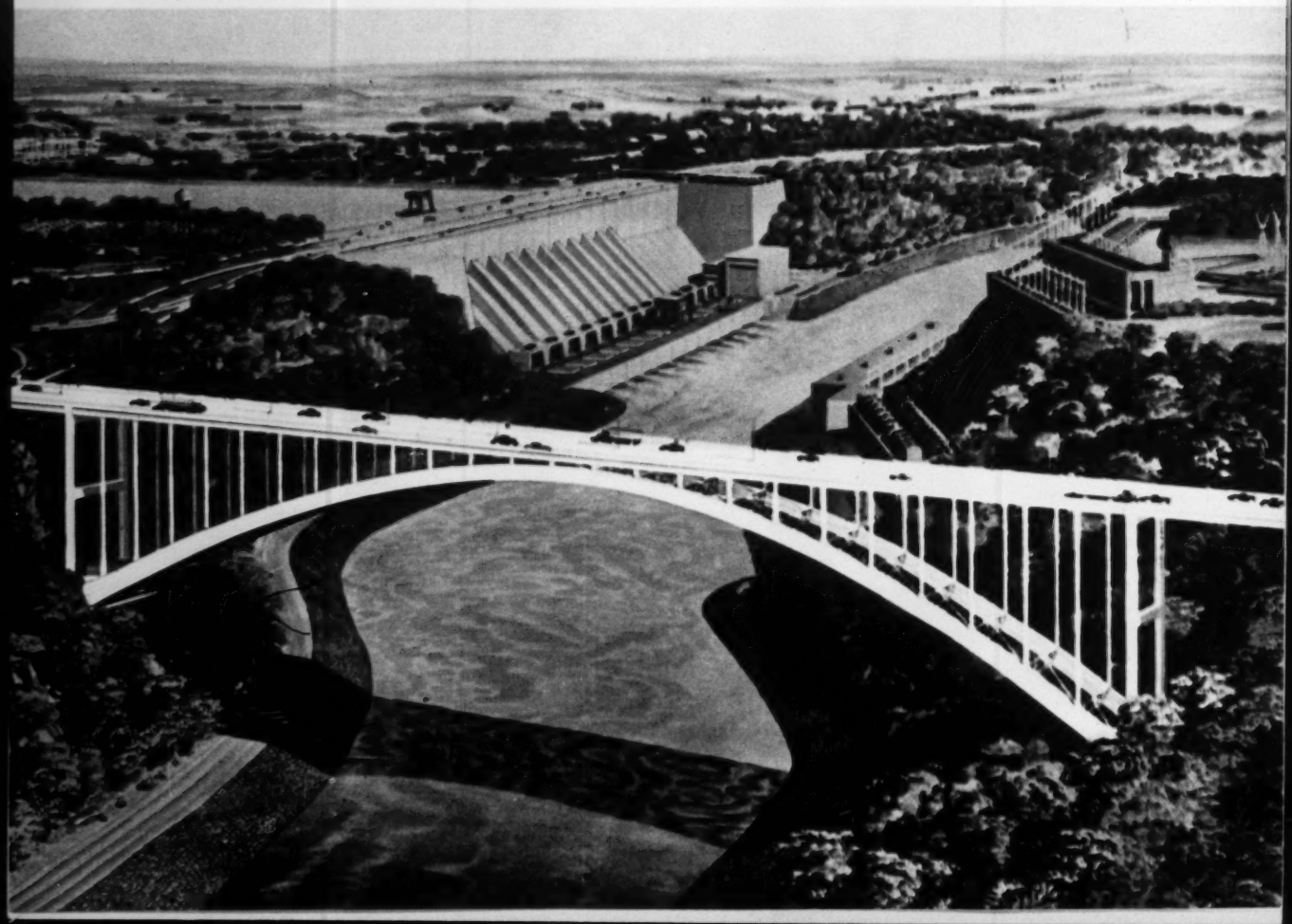
BETHLEHEM STEEL

Bridging a Friendly Border

In October 1960, Bethlehem was awarded the superstructure contract for this graceful arch bridge over the Niagara River between Lewiston, N. Y. (at left) and Queenston, Ontario, six miles downstream from Niagara Falls. Its main span of 1,000 ft will make it the world's seventh longest arch span, and just 50 ft longer than the famous Rainbow Bridge, completed by Bethlehem in 1941. Its roadway will carry motorists some 370 ft above the turbulent waters.

Cost of the project, exclusive of extensive approach work, will be $6.5 million—about $1.4 million *under* the engineer's estimates.

Owner: Niagara Falls Bridge Commission; *consulting engineers:* Hardesty & Hanover; *contractors for substructure and approaches:* Bates & Rogers Construction Corporation (American side); Steed & Evans Limited (Canadian side).



Architect: Maurice Fletcher; *structural engineer:* Kneas & Long; *general contractor:* McCloskey & Co.

Bell Tel Consolidates in Philadelphia

This elegant structure, sheathed in bronze and stainless steel, will soon rise in Philadelphia's resurgent central-city area. It's to be located on Arch Street at Sixteenth and Benjamin Franklin Parkway. There it will bring together about 2,500 employees of Bell Telephone Company of Pennsylvania's home office and area headquarters, who are presently quartered in nine separate locations.

It's a big building, rising 258 ft to the roof of the two-story equipment penthouse that tops the eighteen office floors. Total floor area is nearly 500,000 sq ft, with 378,000 sq ft of net usable office space. Three factors increase the usable space per floor: first, the structural steel columns are located *outside* the building's peripheral walls; second, the central core design eliminates wasted corridor space; third, the use of slim, space-saving stainless steel exterior wall construction.

Sure to evoke much favorable comment are the moat-like pools along Arch Street. Tile-bottomed, and eighteen inches deep, they will reflect the structure's gleaming facade. A "bridge" provides access to the main entrance.

Bethlehem's erection crews will use high-strength structural bolts, making this the city's biggest bolted structure. Total steel requirement is 4,400 tons, fabricated at our Bethlehem, Pa., works.

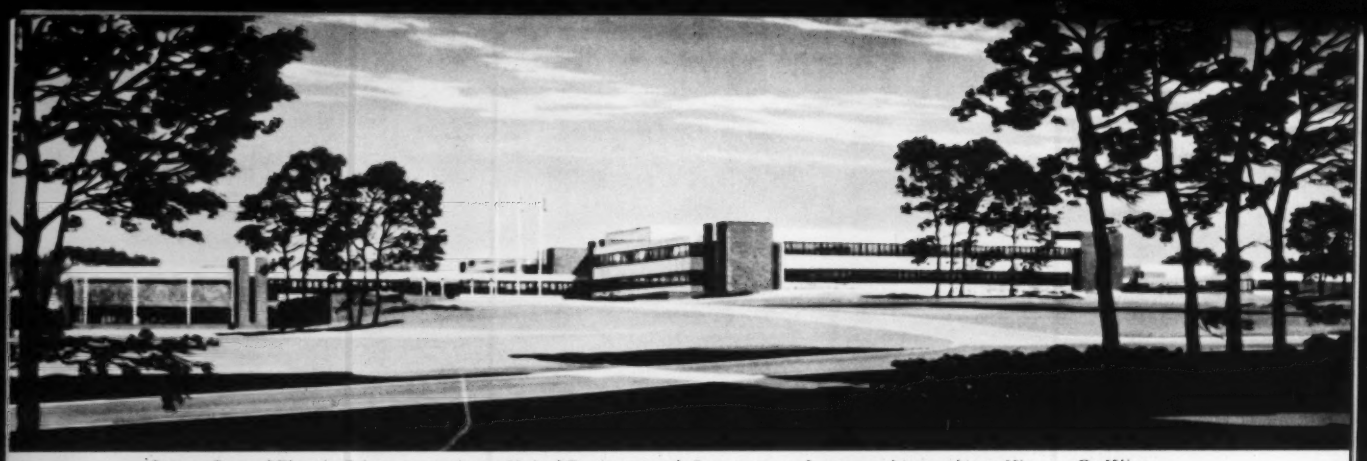
New York State's $100-Million Campus

It's not a university—it's the headquarters of New York State government in Albany. Conceived ten years ago, the far-reaching plan will consolidate scattered offices in new efficient buildings on a campus-like site.

In mid-1960, Governor Rockefeller announced a "sharp acceleration" of the program to complete construction of the vast project. As a result, well over $50 million in contracts for office construction and access highway work is underway or scheduled for the fiscal year. And there's much more to come. The Governor pointed out that the facilities will not only save tax money by increasing the operating efficiency of state departments, but the construction work itself will be a healthy stimulus to the economy.

Of the 22 buildings planned, two are those housing the departments of Conservation and Civil Service. Both have steel frames fabricated by Bethlehem. Nearing completion is the power house (Bldg. 5), and work is underway on the Department of Public Works building (Bldg. 19), both of which have Bethlehem frameworks founded on deep-driven Bethlehem H-Piling.

Architect: Office of the State Architect; *general contractor for the Civil Service and Conservation buildings:* Brown-Turner Inc.; *for Bldg. 5 and 19:* Depot Construction Corp.; *foundation contractor:* Western Foundation Co.



Owner: General Electric Company; *engineers:* United Engineers and Constructors, Inc.; *consulting architect:* Vincent G. Kling

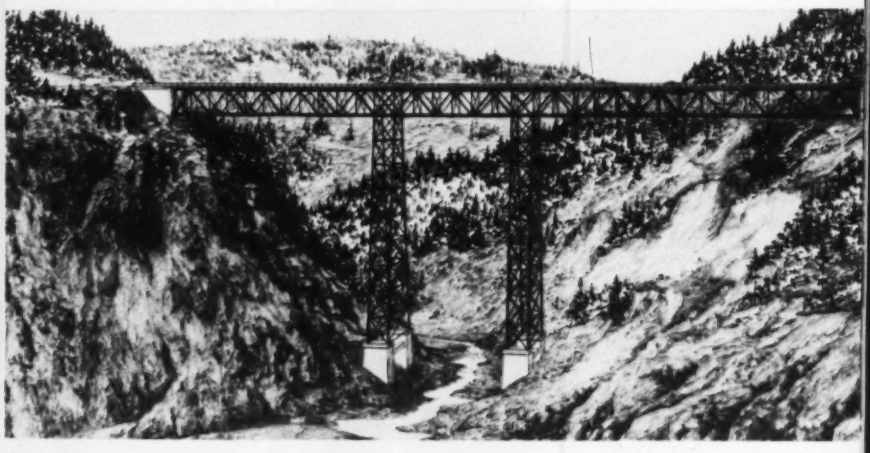
$14,000,000 For Space Research

Historic Valley Forge is becoming closely allied with vital developments of the space age. The reason lies in the significance of construction work in progress at the junction of the Pennsylvania Turnpike and Schuylkill Expressway, just 17 miles west of Philadelphia. There General Electric Company is building a $14-million space center—more properly, the Missile and Space Vehicle Department's research and development laboratories.

The new MSVD facility, located on a 130-acre tract, will eventually employ upwards of 5,000 persons, including as many as 1,200 or 1,400 engineers and scientists—one of the biggest concentrations of such highly trained personnel in the entire land.

The first phase of work (which includes construction of a headquarters building, the Space Sciences Laboratory, and an engineering and development facility) is scheduled for completion late in 1961. The second phase, to begin in 1962, will add facilities for development manufacturing, quality control, acceptance testing, and product design, and will be completed no later than 1963.

Bethlehem has contracted to furnish the steelwork for a major portion of the construction now underway. What appears here to be a single sprawling building actually comprises a number of interconnected buildings. Construction is conventional steel beam-and-column, generally with 24-ft-square bays, and topped with steel roof decking over Bethlehem's open-web joists. The steel erectors will use Bethlehem structural bolts.



Owner-Designer: State of Oregon, Dept. of Highways; *general contractor:* Bethlehem Steel Company, Pacific Coast Div.

Straightening Out U. S. 101

Everyone in the Far West knows Route 101. It's the coastal highway that skirts the Pacific from Juan de Fuca Strait clear down to the Mexican border. Shorelines being what they are, the highway makes many a twist and turn on its 1,600-mile jaunt. One of these is a few miles north of Brookings, in the extreme southwest corner of Oregon.

There a small stream known as Thomas Creek has cut a deep ravine, and 330 ft over it, 957 ft from abutment to abutment, the Department of Highways is constructing a two-lane highway bridge. It is of continuous deck-truss design, supported on two 300-ft-high towers. All members are to be made up of welded plates of ASTM A373 (carbon C) or ASTM A-242 (low-alloy A). Field connections will be made with high-strength structural bolts.

Bethlehem's erection scheme calls for use of a guy derrick to construct the south tower, while a stiffleg derrick traveler erects the roadway from the south approach out over falsework bents. After the roadway lands on the south tower, the center span will be cantilevered out 160 ft to the north tower.

Making Gowanus Grow

The Gowanus Expressway in Brooklyn is already a heavily traveled mid-city elevated highway—but it has a much bigger job ahead. It will be one of three major arteries feeding into the now-abuilding Verrazano-Narrows Bridge, and as such must be capable of handling vastly increased traffic loads, especially as it will be the main connection between the bridge's eastern end and the Brooklyn-Queens Expressway which, in turn, feeds into the river crossings to Manhattan and leads to the Long Island Expressway serving all of Long Island. Total cost of converting the highway to meet the new needs, in accordance with Federal Interstate standards, is estimated at $81 million.

At present the expressway is a narrow, four-lane elevated parkway in Third Avenue. The structure extending from 38th Street to 65th Street was originally an elevated railway, later converted to motor traffic. However, it is totally inadequate to handle the increasing traffic burden, and suffers from the additional limitation of being restricted to passenger-car traffic. The new artery will also serve commercial vehicles.

Conversion of this portion of the parkway to a broad, six-lane elevated highway is a job Bethlehem will be handling in 1961. The over-all project has widened the Third Avenue right-of-way from 80 ft to 180 ft. In order to interfere with normal traffic flow as little as possible, Bethlehem will erect both lines of columns, the center portion of the roadway, and one of the roadway "wings" adjacent to the existing structure, which will remain in operation. Then traffic will be directed onto the four new lanes, while the old el is demolished. Finally the other new "wing" will be added.

The new elevated structure will total 94½ ft in width, providing six traffic lanes in two 38-ft roadways plus a 13-ft median strip with turn-off for disabled vehicles.

Bethlehem's contract, which extends from 36th to 53rd Street, requires about 12,500 tons of fabricated and erected structural steel, as well as large tonnages of concrete reinforcing bars.

Owner: State of New York, Department of Public Works; *consulting engineers:* Madigan-Hyland; *general contractor:* Slattery Contracting Company

Late News Flashes

BRONX, N. Y.--In early '61, Bethlehem will begin erecting nearly 12,000 tons of steel for a 57-span, 4,118-ft-long, 6-lane section of Bruckner Expressway. Bethlehem is also supplying piling and reinforcing bars to Gull Contracting Company, Inc., holder of the $10.5-million Contract 3 of Section 1 of this important phase of New York City's system of Interstate highways.

NEW YORK CITY--Fisher Brothers, one of the city's largest real estate and construction firms, has announced plans to erect a 44-story office building on Third Avenue between 39th and 40th Streets. Bethlehem will put up the 9,000-ton steel framework for the striking and completely modern structure.

DOYLESTOWN, PA.--Bucks County, famous for its many venerable colonial buildings, will soon be noted for one of the nation's more unusual public buildings. It's to be a circular court house building, 156 ft in diameter, five stories high. It requires about 700 tons of steel, to be fabricated by Bethlehem.

JOHNSTOWN, PA.--Pennsylvania Electric Company, a subsidary of General Public Utilities and one of the state's biggest utilities, is constructing a handsome new system headquarters building, along with sizable service and storage facilities. The 220-ft-long, four-story office building (plus a two-story wing) boasts an open, 25-ft-wide arcade at ground level running along the entire front elevation, giving the building the appearance of being partially supported on stilts. Bethlehem is supplying the structural steelwork.

HARTFORD, CONN.--Work is well underway here on Constitution Plaza, one of the nation's biggest--and perhaps the most spectacular--urban redevelopment projects. Among the ten or so structures being constructed on the 15-acre site are two office buildings, 18 and 20 stories in height, for which Bethlehem is supplying the steelwork. The owner-developer is F. H. McGraw & Company.

SOMERSET, MASS.--$80 million is the price tag for New England Electric System's Brayton Point Power Station, on the Taunton River opposite Fall River. The first 250,000-kw unit is slated for completion in 1963. And that's just the beginning. A second unit of equal size will go on line a year later, and three additional units are planned for an ultimate output of 1,000,000 kw. When both units are in operation, the station will be the largest single generating plant in the System. In summer of 1961 Bethlehem erection crews will begin putting up the 5,600-ton structural frame, using high-strength bolts. Stone & Webster Engineering Company is handling engineering jointly with the System's engineering staff.

PALMERTON, PA.--Work has already begun on one of the nation's most unusual highway structures, a northbound two-lane roadway cantilevered on steel beams over the southbound lane for a distance of about 1,200 feet. Reason is the extremely narrow right-of-way through steep-walled Lehigh Gap. Bethlehem is fabricating the steelwork for the general contractor, J. Robert Bazley.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

Steel *for Strength ... Economy ... Versatility*

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611, Printed in U. S. A.

Steam-power plant in New England puts its crane outdoors, while . . .

Translucent Walls House a Generator

The design for a 100,000-kw station near Bow, N. H., leaves everything possible outside. The turbine-generator enclosure is removable, translucent and only 32 x 96 ft and 20 ft high.

It's an unusual plant for a far northern state.

Public Service Co. of New Hampshire is the owner. The first of four units has been built. This unit, plus transmission and auxiliary equipment, which will be common to the entire four-unit plant, cost $23 million.

The minimum-enclosure design saved about $350,000 in the first unit over a conventional plant enclosure, according to Jackson & Moreland, Inc., Boston architects and engineers who worked for Public Service on the plant design.

Records showed that Public Service had seldom run major overhaul on any of their plants during the severe winter months, so the planners decided to turn to the "minimum-cube" design against the remote chance of having to do any extensive maintenance work in the wintertime.

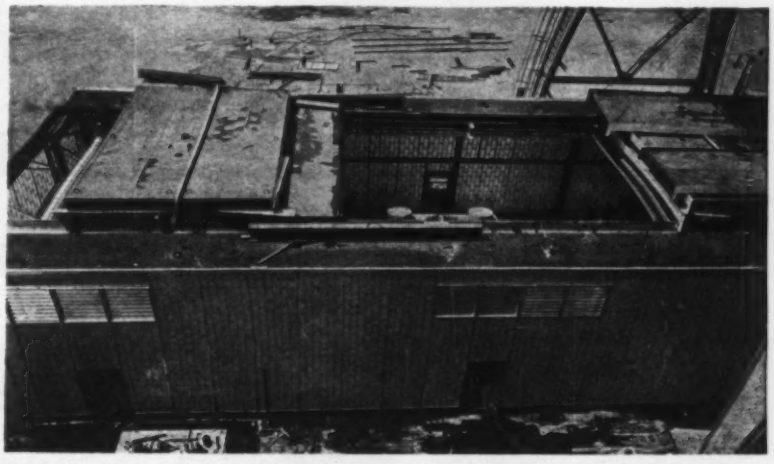
Most prominent feature of the plant is its group of three 175-ft high reinforced concrete coal silos. On one side of these is the turbine-generator section with its 50-ton capacity gantry mounted on rails above the enclosure. On the other side of the silos stands the boiler —open on three sides except for its operating and control level.

Other economy wrinkles in the design include elimination of all windows from the plant, except at stairwells. Blowers provide ventilation throughout. Except in the operating and control room, exterior sheathing is corrugated aluminum. The enclosure over the turbine-generator unit is a light steel frame clad in panels of translucent wall material supplied by Kalwall Corp. of Manchester, N. H.

When maintenance is necessary in the plant, the top comes off the turbine-generator section. For major alterations or additions, the entire enclosure of translucent wall panels can be disassembled. The roof is a series of 12 precast concrete panels in steel frames with lifting eyes for removal by the outside gantry. The demountable wall panels—the Kalwall units—are 4 x 18 ft high but weigh only 1.5 lb per sq ft.

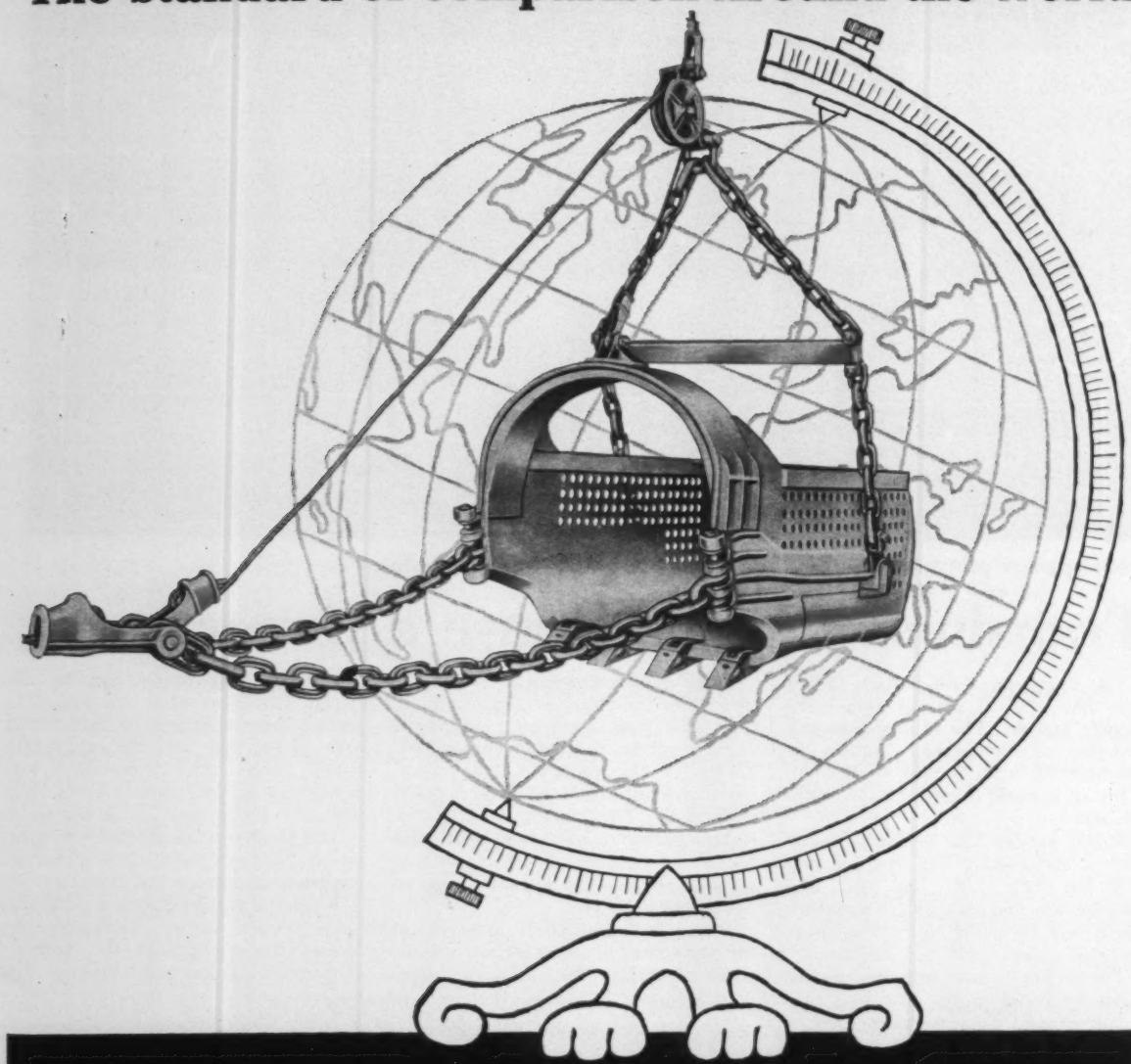
The plant went on line at full capacity in November after Public Service engineers completed test runs.

Builder of the Bow plant was Sanders Construction Corp., Portland, Me. Westinghouse supplied the turbine-generator; Babcock & Wilcox, the boiler.



Hatches in roof permit access to the turbine-generator.

The Standard of Comparison Around the World



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Hendrix Lightweight Dragline Buckets

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

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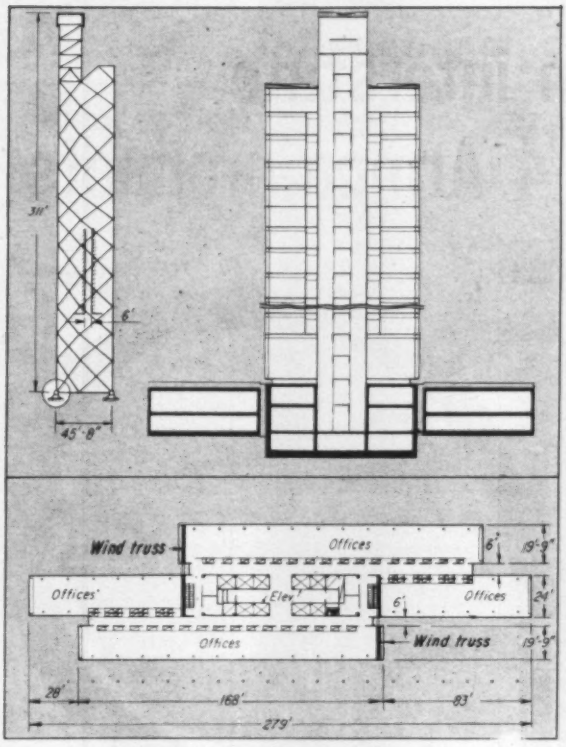


Trusses tie the three tower sections together.

Slim towers pose tie and foundation problems.

Tower Walls Conceal Truss Bracing

By John G. Hotchkiss

An unusual system of wind bracing was used for Germany's tallest office building, a 26-story steel-framed structure built for Phoenix-Rheinrohr AG in Dusseldorf.

The $8-million building consists of three long, narrow towers, the center one rising to a height of 311 ft, four stories higher than the other two. The towers are parallel to each other and 6 ft apart.

The tallest tower is 279 ft. long, but only 24 ft. wide. The other towers, though shorter in length—168 ft—are only 19 ft 9 in. wide. Total design wind load is 2,645 kips. Providing lateral stability in these long narrow structures was a major design problem.

• **No obstructions from framing**—The designers elected to take the wind load on two vertical trusses 110 ft apart, located at the ends of the shorter towers. Floors frame into the trusses and transmit horizontal shear to them. The trusses, acting as vertical cantilevers, carry the shear to the ground. Floor framing consists of 6.5-in. standard I-beams designed for composite action with 3-in. concrete slabs.

The effective depth of the wind trusses, measured center to center of the two columns forming the chords of each, is 45 ft 8 in. Each truss extends the width of two towers. This arrangement leaves the third tower in each case unobstructed by diagonal framing. Yet there is no obstruction in the other towers. In the center tower, framing is encased in a stairwell wall, and in the outer towers, in an end wall.

The framing was left exposed in the 6-ft gap between towers in order to create the impression that the exposed diagonals tie the tall thin masses together.

• **Unusual foundations**—The chords of the trusses may be subjected to a maximum axial compression of 6,612 kips and a maximum tension of 3,526 kips. These forces are transmitted to wall footings through base plates 39 x 79 in. in plan.

Anchorage of the wind columns designed by ordinary procedures would have required a few large-diameter anchor bolts concreted in place, and a massive foundation would have been needed to resist compressive and uplift forces. But space was not available for a conventional footing. Instead, the designers called for a large number of small-diameter anchor bolts to carry the load directly. So, in effect, the column bases rest on the 1¾-in. dia. bolts as if these threaded reinforcing bars were piles.

The bars, varying in length from 16 to 30 ft, are embedded in 4-ft-thick concrete basement walls, three stories high. The walls serve as foundation slabs.

The long bars extend through a 5-in.-thick steel plate, where they were sleeved to another set of bars 6 to 7 ft. long, bolted to an upper plate. Both upper and lower bars were pretensioned with torque-regulating wrenches. The amount of pretensioning imparted to the upper bars was calculated to offset their extension under tensile wind forces.

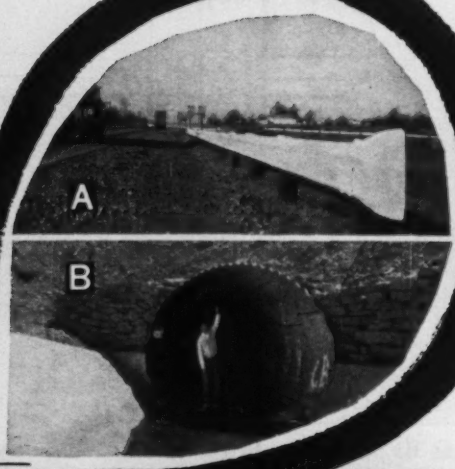
The building was designed and built by August Klonne of Dortmund, Germany.

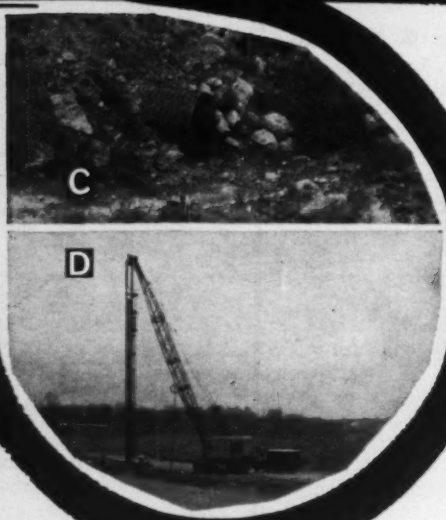
Mr. Hotchkiss is New York Regional Engineer of the American Institute of Steel Construction. He was author of "New Ways to Cut Bridge Weight Lead to Record Spans" (ENR Nov 7, 1957, p. 36), describing how German engineers are making steel bridges lighter and lighter.

Interchange for main interstate highways served by 4 Armco products

Four different Armco products for drainage and construction have been installed at the new interchange for Interstate Highways 70 and 75 (old Dixie Highway and National Road) in Ohio.

That Armco products find ready acceptance in such applications is illustrated by the fact they are installed on almost every Interstate Highway. These steel products are economical. They have ample strength, are easy to install, quickly obtainable, and have enviable records for durability.





Armco FLEX-BEAM® Guardrail A
Armco MULTI-PLATE® Stream Enclosure B
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For further data, write us, or call your nearest Armco Sales Engineer. Armco Drainage & Metal Products, Inc., 4091 Curtis Street, Middletown, Ohio.

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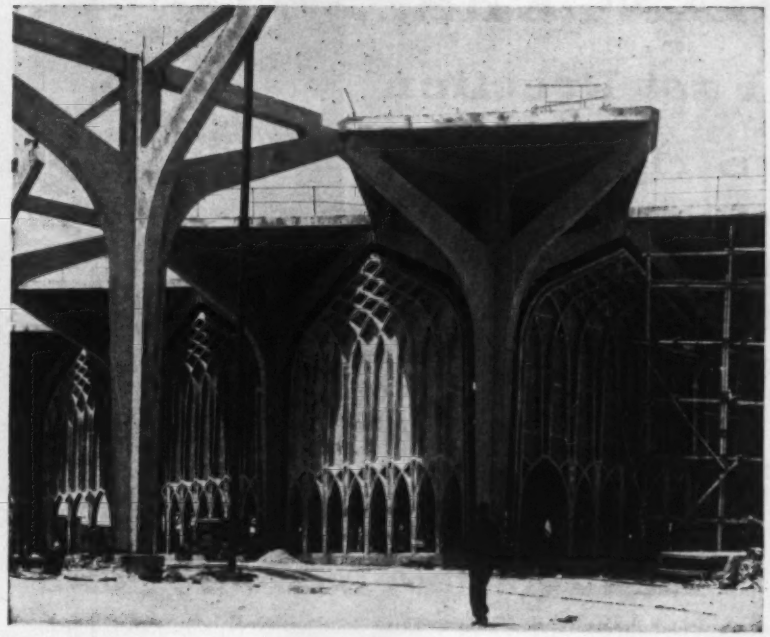
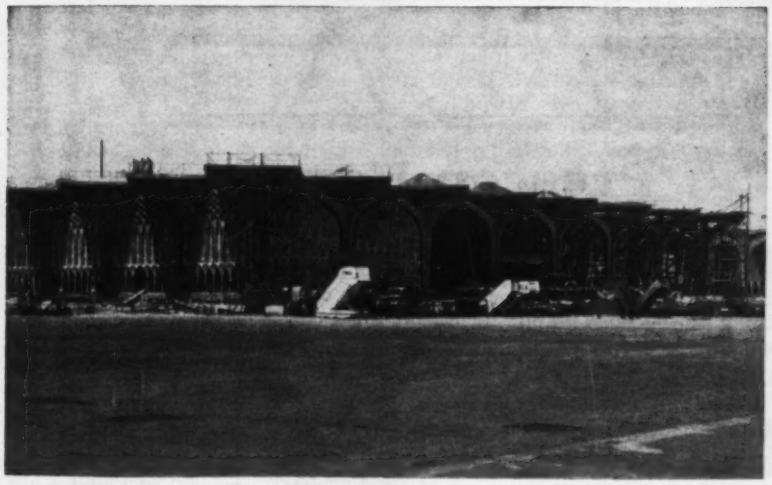


Precast Framing Preserves . . .



Arabian Tradition in Terminal

Precast wall panels and Y-shaped frames, formed in the pattern of Moorish arches, give an Arabian Nights look to an air terminal under construction in Saudi Arabia.

The long rectangular building is enclosed by 34 arched panels, filling in four bays across and 13 bays along the building's length. They will be finished with tile facing.

The wall panels, with their intricate pattern of curved, intersecting ribs, were precast at the jobsite and tilted into place. Field crews connected them to the exterior arch frames by field-welding steel plates projecting from both kinds of precast elements.

A U. S. training mission at Dhahran Airfield is building the terminal for the Saudi Arabian government. Trans World Airlines has recently inaugurated jet service from the United States to Dhahran.

Ralph M. Parsons Co. of Los Angeles is engineer; Minoru Yamasaki of Birmingham, Mich., is architect. Oman-Farnsworth-Wright of New York City is general contractor.

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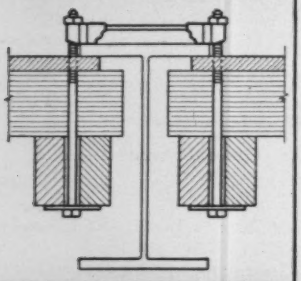
Designed for Fast Erection and Easy Stripping

FOR STEEL BEAMS AND CONCRETE GIRDERS

ADJUSTS FROM TOP OF DECK



NEW

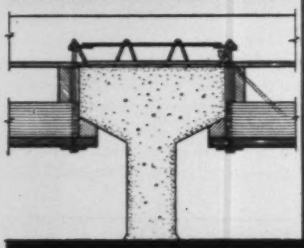
Pres-Steel Hanger

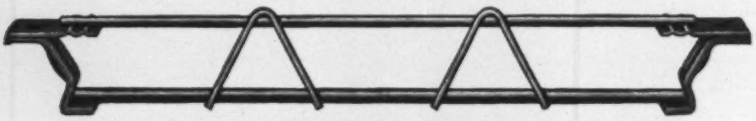
(Pat. pending)

This newly developed Pres-Steel Hanger combines the desirable features of conventional hangers, yet costs less! Assembly is simple, ½" Coil Bolts are passed up through the hanger—no threading is necessary—and a square coil nut is applied. All adjustment is made conveniently from the top of the deck. The foot of the hanger has a saw tooth edge which bites into the flange upon application of a load, preventing any movement of the hanger. The flat top provides even bearing for the nut and the bolt hole is so formed that there is no binding of the bolt on removal. Pres-Steel Hangers are also made to take the bolt or coil rod at 45°.

These economical hangers have a safe working load on steel beams of 8,000 lbs. (ultimate capacity 14,500 lbs.). On concrete girders the safe working load is 6,000 lbs. (ultimate capacity 9,000 lbs.).

ADJUSTS FROM TOP OF DECK



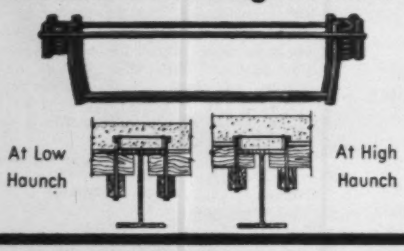


Prescon Hanger

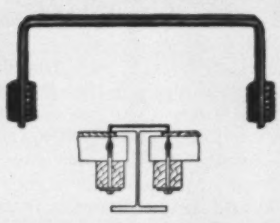
This unique hanger provides hanging points cantilevered away from the concrete girder sides. The forms are hung from coil bolts threaded into heavy square coil nuts bearing on the top plate. Provision is also made for haunch forming above the girder. Adjustment is made conveniently from the TOP of deck. Simultaneous overhanging slab or curb forming is accomplished with coil rod and wing nut at 45°. Available in two types—6M (6,000 lb. safe working load) and 10M (10,000 lb. safe working load). The use of Prescon Hangers on concrete girders eliminates hazardous, makeshift methods.

OTHER SUPERIOR HANGERS FOR HANGING FORMS ON BRIDGE SUPERSTRUCTURES

Haunch Coil Hanger Frame



Coil Beam Saddle



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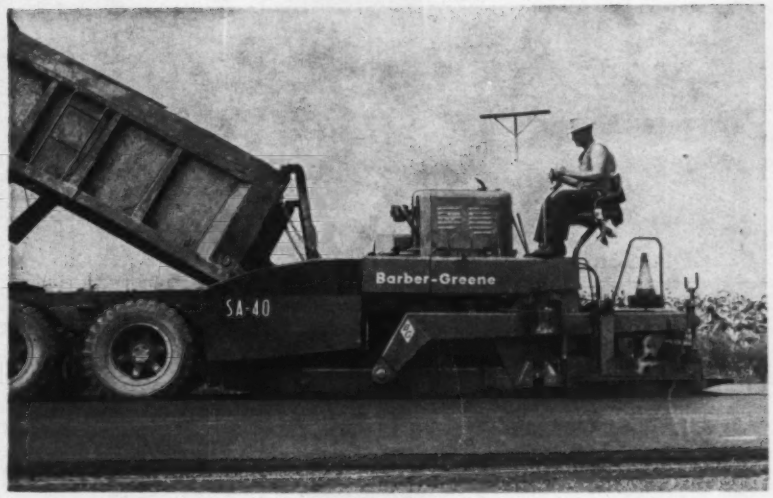


Crawler-Mounted Asphalt Finisher

The Barber-Greene line of asphalt finishers has added the SA-40, a crawler-mounted machine designed to place asphalt surfaces 8 to 14 ft wide at speeds of up to 100 fpm.

The SA-40 is constructed with hydraulically operated hopper sides that permit self cleaning of the receiving hopper.

Pivoting truck contact rollers allow the operator to push a misaligned truck without any change in direction of rig travel.

The SA-40 has a hydraulically driven tamper to compact the asphalt before strike-off, and a heavy duty, heated screed.

Both the screed and the tamper are mounted on specially designed self-leveling support arms.

The power train and other moving components of the SA-40 are completely housed for protection and appearance. Doors placed at strategic locations provide quick and easy access to components for maintenance or repairs. BARBER-GREENE CO., AURORA, ILL.

Modified Auger Has Better Bite

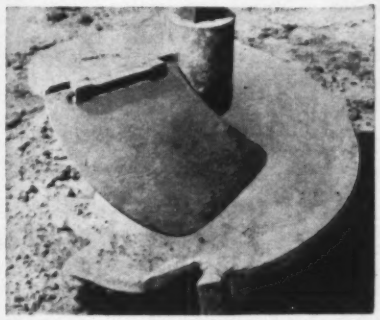
An improved version of the Poler-Bore auger features a redesigned penetrator point, a mounting system that eliminates bolts and nuts, and a detachable flapper gate as optional equipment.

The auger's drill point, designed for rocky or frozen ground, has more deeply contoured flukes and an increased rake angle that is said to pull the auger into the ground with more force.

Bolts and nuts have been eliminated for mounting both the drill point and the auger itself. A patented coil-type drive-pin is used in both cases. The pin cuts out the drag created by protruding bolt heads and nuts, says the manufacturer.

An added optional feature is a flapper gate that can be attached to the trailing edge of the auger when spoil resists lifting.

In addition to the improved Poler-Bore, the firm has introduced a line of small earth augers. The new line, dubbed "PosterBore," is designed for boring holes for pole anchors, guard rail posts, and signs.



Made of cast steel, the augers come in 8-in., 10-in., and 12-in. diameters. TRAINER ASSOCIATES, INC., NEW CASTLE, DEL.

(*New Products continued p. 52*)

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Just Out. Covers every detail of the estimator's job—describing how to compute material, labor, equipment, and overhead costs for accurate estimates. **By H. Pulver, Consult. Engr. 3rd Ed. 640 pp., 126 illus., $12.00**

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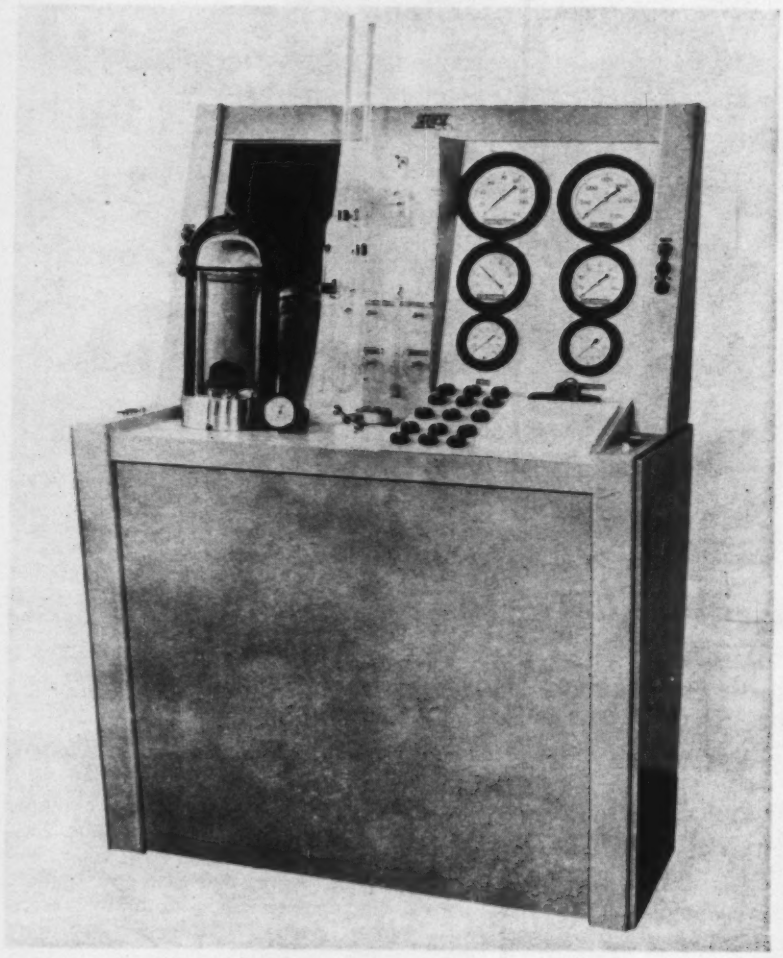


Triaxial Shear Tester Offered

A console-type triaxial shear apparatus will be in production soon.

All its operating controls and gages for reading pressure, load, and operating speeds, are located in one section of the apparatus.

The triaxial cell is detachable from the test frame and is designed so that the operating piston does not come through the head of the chamber, but moves in from the base.

Readings of load applied to the specimen are obtained through a load cell mounted in the head of the testing chamber. Readings are transmitted to a large indicator on the control panel. SOILTEST, INC., 4711 W. NORTH AVENUE, CHICAGO 39, ILL.

No-Sink Tires for Tough Terrain

Using large, comparatively flexible tires at air pressures as low as 5 psi, T-Kit wheels are quickly interchangeable with conventional wheels. They are said to achieve such a high degree of flotation that vehicles can operate over ground too soft and unstable to support a man walking.

In one application a geophysical company equipped several seismic survey teams with them for carrying sensitive instruments across rough terrain. A novel application is for transporting materials on a large roof under construction.

The T-Kit is interchangeable with conventional wheels on most two- and four-wheel drive vehicles up to 10,000-lb gross weight without any modification of the basic vehicle. Under development are high-flotation T-Kits for vehicles up to 50,000 lb gross weight. TERRA ENGINEERING CO., INC., P. O. Box 163, LEXINGTON 73, MASS.

Monitor Concentrates Radiation in Water

A new monitor measures radioactivity of water continuously and automatically, according to the maker.

The concentration necessary for detection is achieved by evaporation. Water to be tested drips on to a continuously moving absorbent paper strip, where it is evaporated by a heating device.

The tape carries the concentrate in front of one or several large surface scintillation counters. The strip containing the residues is available for later tests and can, for example, be reduced to ashes for further examination by chemical analysis.

The standard instrument contains a beta counter. Provisions are made for the addition of an alpha counter. The equipment is designed to measure activities due to strontium 90 down to 5×10^{-8} microcuries per milliliter of water. LANDIS & GYR, INC., 45 WEST 45TH STREET, NEW YORK 36, N. Y.

Machine Tests Bond Of Pavement Joint Sealers

Bond between a concrete pavement and a joint sealer can be tested with the Joint Extension Machine.

The machine is designed to evaluate sealers made of plastic and bituminous materials. In the test, small cement mortar blocks (1x2x3 in.) are bonded with the sealer. The testing machine simulates the expansion of a pavement joint, pulling the blocks apart at the rate of $\frac{1}{8}$ in. per hour.

The machine may be run at temperatures as low as −20 deg F. The design and operation of the joint-bond apparatus is in accordance with federal specifications; Corps of Engineers requirements and with ASTM procedure. SOILTEST, INC., 4711 W. NORTH AVE., CHICAGO 39, ILL.

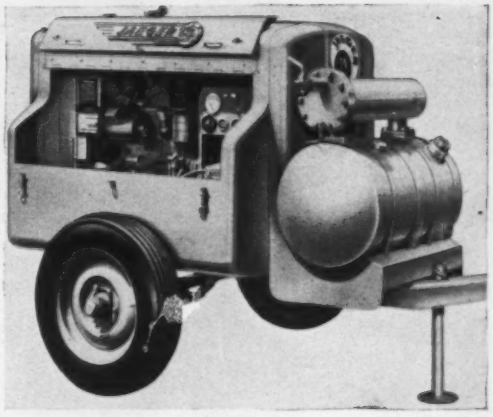
Aluminum Trucks, Trailers Dump to Either Side

Side-unloading aluminum dump trucks and wagon trailers carry 10 cu yd of material. The wagons can be attached in tandem to the trucks.

Each wagon is 8 x 14 ft and weighs 5,000 lb. A tractor wagon with two trailer wagons is 60 ft long. Single stroke hoist cylinders, which can be operated from the tractor cab, tilt the wagon body to a 55-deg unloading angle.

Loads may be dumped to either side of the wagon. DIFFERENTIAL CO., FINDLAY, OHIO

75 cfm operates a heavy breaker at top efficiency.



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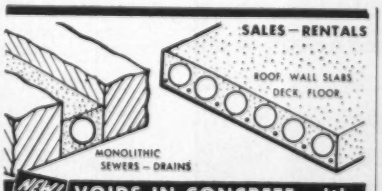

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Only Allis-Chalmers offers exclusive KON-TORK differential in every motor scraper. This traction-boosting benefit makes dirt pay under severe job conditions.

KON-TORK works automatically, whenever it's needed. In the cut, on the haul or soft fill, it helps you by automatically controlling the transfer of torque to each drive wheel . . . giving you the benefit of all available traction *all the time.*

Example: When one drive wheel hits soft going, KON-TORK takes hold and transfers torque from the slipping wheel to the wheel with solid footing to keep the machine moving out. Another nice thing

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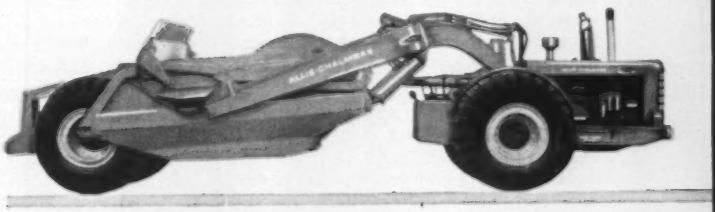
But this is only one of many features that keep Allis-Chalmers motor scrapers out front on every job. You should see what *full-power steering—double-acting bowl jacks—hydraulic forced ejection and highest apron lift* can do for your production. Try any one of 3 models from 10 to 30 yards. See for yourself. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

KON-TORK is an Allis-Chalmers trademark.

Now available in Persian Orange or Allis-Chalmers Yellow at no extra cost.



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International Bridge Approach Span

Michigan-Ontario main spans, Sault Ste. Marie Bridge, designed for balanced cantilever erection

The Michigan State Highway Department awarded this $1,798,798 approach span in two separate contracts for substructure of eighteen reinforced concrete piers, and steel superstructure with concrete deck.

Darin & Armstrong, Inc., Detroit, took the substructure contract for $611,619, 3% under the second low bid by Raff & Dexter, Marks, E. C. Nolan, Jarvick Construction, Lansing, Mich.

The superstructure contract went at $1,187,179 to Raff & Dexter, Lansing. John F. Beasley Construction, Chicago, was second in this close contest, bidding just 2% off the mark.

Both substructure and superstructure of the Michigan approach spans will be built by the Michigan State Highway Department with federal Interstate funds. The canal spans and Canadian approach structure will be paid for by revenue bonds and built by the International Bridge Authority, which was created by the Michigan legislature to investigate, finance, and construct a bridge at Sault Ste. Marie. Steinman, Boynton, Gronquist & London, New York City, are the consultants for the entire bridge project.

Work on the substructure includes eighteen reinforced concrete piers (three soil bearing and the remainder founded on sandstone rock); the abutment, founded on steel H piles; earth and rock foundation excavation; construction of underground drainage, and other incidental work.

The substructure itself will consist of a reinforced concrete abutment about 10 ft high with wingwalls, ten reinforced concrete hammer-head piers varying from 25 ft to 67 ft high, two pylon piers 85 ft high, and six two-legged bent piers with single top strut from 77 ft to 104 ft 6 in. high. All measurements are from bottom of footings to bridge seats.

The steel superstructure is designed for balanced cantilevel construction. It will have a concrete deck with a 1½-in.-thick bitminous concrete wearing course, pipe curbs, steel railings, deck drainage including pipes down the face of several of the piers, roadway lighting and incidental work.

There will be eleven rolled beam spans varying from 31 ft to 93 ft 5 in., one truss span 279 ft long, and seven plate girder spans varying from 132 ft 9½ in. to 150 ft 7 in. Of the 19 approach spans, the first eleven simple beam spans will be composite construction.

The concrete deck will carry two lanes of vehicular traffic on a width of 28 ft between curbs. The roadway will be flanked by a 2-ft sidewalk with steel railings mounted along the outside and separated from the roadway by pipe curbs. Galvanized steel conduits for the roadway lighting will be embedded in the concrete.

Borings made along the center line of the approach revealed rock at a generally shallow depth of from 2 ft to 10 ft. The rock is sandstone with sand or clay seams in some locations; the overburden consists of sand, gravel, and sandstone fragments.

The bridge will cross the ship canals at a point immediately east of the existing railroad bridge. The location was chosen for several reasons: first, the bridge will have relatively short spans and will be located over shallow water and at shallow depth to rock, second, the location is as far above the locks as possible, to minimize any hazard to the locks, and finally, the bridge is within the cities to best serve intercity traffic in order to realize the maximum toll revenue for the project. And it will connect directly with the proposed Interstate Highway system through Interstate Rte 75 in Mich. which will be located at the west edge of the city. The bridge plazas are readily accessible to local traffic from either city.

The location will also minimize any interference with the railroads on both sides of the river.

Wages on the project include: laborers, $2.145–$2.845/hr; trenching machine operators, crane operators, and piledrivers, $3.295/hr; air compressor, $2.845/hr; rubber-tired tractor, $2.695; truck drivers, $2.66; cement mason, $3.15; carpenters, $3.00; bricklayers, $3.875 on substructure, $4.00 on superstructure; plumbers, $3.40; structural steel up to 40 ft–$3.30, 40 ft to 100 ft–$3.85, over 100 ft–$4.85.

The bidding included:

Substructure

1C	Darin & Armstrong, Inc., Detroit, Mich	$611,619
2	Raff & Dexter, Marks, E. C. Nolan, Jarvick Const., Lansing, Mich	631,801
9	Ruckman & Hansen, Inc., Fort Wayne, Ind.	821,480

Bids: 6-15-60 Items	Unit	Quantity	Unit Prices 1C	2
Pavement, old remove	sy	10	$1.00	$1.00
Masonry & conc, remove	cy	20	10.00	8.00
Exc, earth	cy	1,600	1.00	2.00
rock	cy	150	15.00	10.00
Mat, porous grade A	cy	200	3.00	2.00
Conc sew, cl E, jacked in pl 15"	lf	35	20.00	20.00
30"	lf	70	35.00	40.00
Sew, 6' deep or less 12"	lf	152	4.00	4.50
18"	lf	268	6.00	7.50
30"	lf	405	12.00	9.25
6.1' to 14' deep 12"	lf	163	5.00	12.75
15"	lf	133	6.00	13.25
24"	lf	293	8.50	17.85
30"	lf	170	14.00	19.00
Conc sew, 6' deep or less 24"	lf	4	8.50	8.50
6.1' to 14' deep 24"	lf	67	8.50	17.25
MH, 6' deep or less	ea	1	300.00	250.00
6.1' to 14' deep	ea	10	400.00	400.00
CB, 6.1' to 14' deep	ea	5	500.00	375.00
Conc base crse unif 8"	sy	10	10.00	6.00
Bit, conc wear crse	t	2	20.00	25.00
bond coat	gal	3	1.00	0.50
Clearing & grubbing	ls	job	600.00	2,500
Barricades	ea	5	50.00	125.00
CIP 30"	lf	4	200.00	75.00
36"	lf	4	250.00	100.00
Traffic, maintain	ls	job	5,000	2,500
Watermain 12"	lf	120	20.00	26.00
Blocks, thrust	ea	6	50.00	10.00
Cofferdams	ls	job	36,668	6,000
Exc, dry	cy	4,028	2.00	2.00
wet	cy	629	6.00	5.00
rock	cy	1,734	15.00	7.50
Steel piles furnished	lf	1,198	5.00	4.50
driven	lf	1,122	1.50	3.00
cutoff	ea	30	3.00	10.00
test	ea	2	100.00	100.00
sheet piling lip	sf	4,048	5.00	3.00
Conc substructure grade A, a	cy	2,970	30.00	35.00
b	cy	5,954	40.00	50.00
Dowels, position	ea	12	3.00	5.00
Cement	bbl	12,760	4.50	4.50
Steel, reinforcement	lb	610,463	0.11	0.11
structural, fab & erection	lf	6,600	1.00	0.36
Sleeves bolt anchor, place	ea	252	10.00	5.00
with anchor bolts, place	ea	76	10.00	5.00
Rods, tie	ea	24	100.00	50.00
Filler, Joint ½"	sf	38	1.00	1.00
¾"	sf	19	1.00	1.00
Waterproofing, joint	sf	59	2.00	2.00
Protection slope, cl B	sy	160	7.00	8.00
Mat, porous grade A	cy	1,400	3.00	2.00

Superstructure

1C	Raff & Dexter, Lansing, Mich	$1,187,179
2	John F. Beasley Constr., Chicago, Ill	1,209,656
5	Darin & Armstrong, Detroit, Mich	1,332,783

* fabrication & erection

Bids: 8-17-60 Items	Unit	Quantity	Unit Prices 1C	2
Bit, conc wearing crse	t	528	$17.50	$18.00
bond coat	gal	960	0.40	0.75
Conc, superstructure gr A	cy	2,095	60.00	60.00
Cement	bbl	3,075	5.00	4.60
Steel, reinforcement	lb	549,152	0.11	0.115
struct in beam spans*	lb	1,200,000	0.155	0.1435
in gird spans*	lb	1,925,000	0.196	0.21
in truss span*	lb	800,000	0.258	0.265
Connectors, shear	ls	job	10,000	8,000
Filler, joint 1"	sf	293	1.00	2.00
rubber-asph, hot pour	lf	564	1.75	3.00
Waterproofing, joint	sf	74	2.00	1.00
Copper	lb	225	2.00	4.00
Steel, bri rail fab, erect & paint	lf	4,155	10.00	12.00
Painting, field	ls	job	40,000	19,000
Steel, pipe curbs fab, erect & paint	lf	4,231	8.00	8.00
Cast iron scuppers	ea	31	150.00	175.00
WIP drains 6"	lf	1,400	12.50	20.00
8"	lf	600	16.00	26.50
Cond, asb cmt undgnd, conc encased 2"	lf	100	3.20	3.00
3"	lf	150	3.38	3.00
galv steel & fit 1½"	lf	130	2.22	2.00
2"	lf	3,200	2.53	2.50
3"	lf	2,300	4.20	4.00
Lt, stdn with luminaire	ea	12	530.00	500.00
& conc fdn	ea	3	800.00	700.00
Cable #6	lf	11,000	0.57	0.55
bare copper strand	lf	300	0.47	0.50
Regulators, constant current	ea	2	2,900	2,600
Serv box, cast iron 30"x14"x9"	ea	13	315.00	300.00
24"x14"x9"	ea	7	245.00	220.00
conc 19"x12"x26"	ea	12	285.00	250.00
30"x18"x30"	ea	3	375.00	350.00

Materials Prices

Monthly Market Quotations by ENR Field Reporters

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. carload lots cash, dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.* truckload del.* per block		CONCRETE Ready Mixed 1:2:4 del. per cy
	Paper	Bulk	Mortar	Gravel, ½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt. wgt. agg.	50 cy & over
Atlanta‡‡	$4.30a†	$3.80a†	$3.62a†	$2.25a‡	$2.50‡	$2.00‡a	$3.05	$3.05a	$3.80r	$3.90r	$0.19o	$0.22o	$13.00g
Baltimore	4.42a	3.91a	3.56a	2.80‡a	2.80‡a	2.25‡a	2.85‡a	2.90‡a	2.05‡a	2.00‡a	.18a	.18a	13.50ou
Birmingham	4.43c	3.50c*f*	....	2.53ns	2.53ns	2.13ns	2.75s	2.75s	1.65d	1.75d	.19	.19	14.25q
Boston	5.83ip	4.53ap	4.90imp	3.00qsz	3.00qsz	3.00qsz	1.75qsz	1.85qsz	....	....	.23o	.275ao	15.00q
Chicago	4.52ag	4.02ag	4.15g	3.78‡e	3.78‡be	4.13‡be	3.95‡be	3.95‡be	2.25‡s	2.25‡s	.26‡s	.26‡be	14.50rl
Cincinnati	4.84c	4.34c	4.31c	2.29‡cu	2.34‡cu	2.44‡cu	2.55‡cu	2.74‡cu	1.80u	1.80u	.19o	.25ao	15.00qr
Cleveland	4.77	....	4.19‡as	....	2.25as	1.75as	2.70fy	2.70fy	2.20‡f	2.20‡f	....	.23f	17.25u
Dallas	3.90a	3.40a	3.78a	2.65‡a	2.75‡a	1.90‡	2.47	2.67	....	....	....	.285	11.10x
Denver	4.89a	4.39a	4.89	1.95‡	2.15‡	1.42‡b	....	3.00‡x	....	....	.25	.27ao	11.90
Detroit	4.24a	3.91ago	3.29av	2.50cc	2.50cc	2.16cc	2.80ddbm	2.80ddbm	3.15ddaa	3.50ddayaa	.24u	.27‡au	15.50eaa
Kansas City	4.52a	3.97a	4.30a	....	....	1.70‡a	2.10‡a	2.10‡a	....	....	.22a	.27c	14.50
Los Angeles‡‡	5.12cA	4.68cA	5.60c	2.56‡at	2.76‡at	2.41‡at	2.41‡at	2.46‡at	....	....	.225f	.385	12.46Alx
Minneapolis	4.68a	4.17a	4.26a	2.70‡as	2.70‡as	1.60‡as	4.00‡as	4.00‡as	....	....	.20q	....	14.55f
Montreal	3.36‡dt†	3.11‡dt†	3.72‡dt†	1.90‡a†	2.15‡a†	2.40‡a	1.90††	2.15††	2.00†	2.00†	.20†	.28‡†	10.80ek†
New Orleans	4.17b	3.65b	3.97b	2.61b	2.61b	2.16b	....	....	1.65d	1.75d	.25r	.35	14.00e
New York	4.71a	4.20a	3.77a	....	....	3.20bk	2.85blbb	2.85blbb	....	....	.265nwo	.32bwo	17.60ay
Philadelphia	4.51‡as	4.01‡as	3.63‡e	1.95‡a	1.95‡a	1.55‡a	2.00‡a	2.30‡a	2.25‡a	2.25‡a	....	.20w	13.90z
Pittsburgh	5.65bjk	4.62bj	5.00bjl	2.68‡aqx	2.68‡aqx	3.08‡aqx	2.00‡aqx	2.00‡aqx	2.10w	2.10w	.22rx	.22rx	16.15o
St. Louis‡‡	4.59a	4.09a	4.29a	3.40‡as	3.40‡as	2.40/3.40‡as	1.75fx	1.75fx	....	....	.26‡s	.32‡eo	13.65/14.10q
San Francisco	4.84c	3.79c	4.78c	2.02	2.02	2.12	2.17	2.17	....	....	.24	.28cl	13.00cw
Seattle	4.47‡a	3.75ag	4.65a	4.25‡bm	4.25‡bm	4.50‡bm	4.50‡bm	4.50‡bm	....	....	.288s	.384cs	14.70f
Toronto	4.40ui	3.84t	4.40ui	2.40	2.40	2.05	2.40	2.40	2.40	2.40	.26	.30cu	13.75q

‡ Delivered. * Prices incl. dealers discount except as noted. # Add 4% sales tax. ## Add 2% intrastate sales tax. † Plus 6% Mun & Prov tax. ‡‡ Add 3% state sales tax.

CEMENT: *a Less 10¢ disc. 15 days. *b Less 2% disc. 15 days. *c Less 10¢ disc. 10 days. *d 10¢ disc. 20 days. *e Truckload lots. *f Fob mill, add $14.58 to $21.31 per car switching charges. *g fob mill + freight. *h LCL. *i Less 2% disc. 10 days. *j Truck lots, fob yard. *k 100 bag lots. *l over 150 sacks. *m Sold in bags only. *n Less 5% disc. 30 days. *o Plus 50¢ for Sat. del. *p 5-8 ton truckload. *q F.o.b. mill *s In bags & bbl. Only *t min. 7 tons *u 200-bag lots *v one-line haul.

SAND, GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons up. *d Less 5¢ disc. 10 days. *e Less 2% disc. 10th. *f Less 2% disc. 15th. *g Less 5% for cash. *h Less than 5 tons. *j F.o.b. quarry. *k Barge lots asd. *l F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *q F.o.b. yard. *r less 8% disc. 15th. *s Less 2% disc. 10 days. *t Less 10¢ disc. 10 days. *u Less 5¢ disc. 10 days. *v Less 2% disc. 15 days. *w Less 10¢ disc. 15 days. *x Incl. 35¢ switch. charge. *y F.o.b. dock. *z 5-8 tons. *aa Less 8% disc. 15 days. *bb Less 2% 25th of month *cc F.o.b. plant cl *dd F.o.b. plant.

CONCRETE BLOCK: *a Cinder. *b Wayllte. *c Haydite. *d Calocrete, *e 5¼ x 8 x 12 in. *f 8 x 4 x 16. *g F.o.b. truck at job. *i F.o.b. plant San Rafael. *m F.o.b. yard. *n 8 x 8 x 16. *o Less 2% disc. 10 days. *p Less 2% disc. 10th. *q Less 5% disc. 10th. *r Less 2% disc. 15 days. *s Less 2% disc. cash. *t Siporax, 7 x 8 x 16. *u Less 5% disc. 10 days. *v Less 12% disc. 15th. *w Made to order.

READY MIXED CONCRETE: *a 6 cu yd or over del. Man. *b 25 cu yds or more *c 10-100 cy. *d 1-3 mi. zone add 15¢ for ea. add'l 1-mi. zone. *e 3,000 lb comp *f 2,500 lb. comp., less 5% disc. 30 days. *g Less 25¢ disc. 15 days. *h Less 50¢ for cash *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 6% mun. & prov. tax. *l 1:2½:3½ base price. *m F.o.b. yard. *n Plus escalator clause. *o Less 2% disc. 15 days. *p Less 50¢ disc. 15 days. *q Less 2% disc. 10 days. Add 50¢ per zone. *r 2000 wgt. *s Less 5% disc. 10 days. *t Incl. 50¢ heating. *u Less 2% disc. 15th. *v Sat. del.+50¢. *w 10-100 cy. *x Del in zone 20-B. *y less 25¢. 10 days. *z less 1% in 30 days. *aa 6 bag mix

CURRENT MAXIMUM PRICES AT CEMENT MILLS: Subject to 10¢ discount, 15 days. For paper bags add 50¢ per bbl., not refundable. *Prices guaranteed through December 31, 1961*

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn	$3.55	Buffington, Ind	$3.55	Steelton, Minn	$3.60	Muskegon, Mich	$3.55	Toledo, O	$3.60
Clinchfield, Ga	3.55	Independence, Kan	3.35	Leeds, Ala	3.40	Saginaw, Mich	3.60	Milwaukee, Wis	3.60
Kingsport, Tenn	3.55	Hannibal, Mo	3.55	Duluth, Minn	3.60	Wyandotte, Mich	3.60	Green Bay, Wis	3.60
West Des Moines, Iowa	3.65	Northampton, Pa	3.50	Hudson, N. Y	3.50	Buffalo, N. Y	3.55	Ironton, O	3.65
Nazareth, Pa	3.50	Universal, Pa	3.60	Alpena, Mich	3.50	Oswego, N. Y	3.60	Montreal, Can	2.81
Bath, Pa	3.50	Waco, Tex. (+ 10¢ tax)	3.35	Detroit, Mich	3.60	Cleveland, O	3.65	W. Winfield, Pa	3.60
Leeley, Pa	3.60	Giant, S. C	3.55	Howes Cave, N. Y	3.50	Alsen, N. Y	3.50	Security, Md	3.50

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT		ASPHALT BINDERS—FLUXES		CUTBACK ASPHALT MC per ton		ROAD OIL	ASPHALT EMULSION RSI	
	Granite Per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 18-lb. treat	Per ton, less than 80 penetration		Per gal., 80-300 penetration				Per gal.	Per gal.	
				Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	e	e	e	$0.1152w	$0.1220w	$0.1182w	$0.1220w	$0.1222w	$0.1258w	$0.1258S	$0.1288w	$0.1327w
Baltimore	e	e	e	21.00t		.09t	0.18	.09weE	.18weE	.095t	.10t	0.19t
Birmingham	.....	66.00i	.....	25.12	25.69O	.1069	0.1093O	.1162w	1188Ow	.1006O	.1069	0.1093O
Boston	.....	.....	.....	22.00asS	46.00asS	22.00asS	46.00asS	.105awF	.22awF	.14aOR	.18OR	.....
Chicago	180.00‡a	98.00‡ab	3.95/4.00‡aj	22.00b	32.00b	20.40bv	30.40bv	.10bwH	.18bwH	.08b	.....	.....
Cincinnati	.....	.....	.....	24.00SU	.....	24.00ff	.....	.1165wSU	.....	.100	.1265	.....
Cleveland	.....	89.50‡d	6.30	26.00tA	.....	26.00twA	.....	.1165twAF	.....	.....	.1265tA	.21A
Dallas	e	40/80p	e	26.90	46.35	.1138	.1983	30.50	52.45	.1100	.1138	.1983
Denver	.....	62.00a	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit	.....	114.00	.....	31.50R	.....	32.20wR	.....	30.24w1R	.....	27.84	.....	.24
Kansas City	e	e	e	18.75cl	.....	18.75cl	.....	.0875J	.....	.0675c	0.10	.....
Los Angeles‡	e	e	e	19.00dwx	.....	19.00dwx	.....	20.50d Kx	.....	19.50dwa	21.40iXv	.1842jXv
Minneapolis	.....	.....	3.73h	23.70	.....	23.70v	.....	.105w	.....	0.95	.1375bb	.....
Montreal	e	e	e	30.50n	43.60n	.167n	.211n	17.80nwE	22.20nwE	.155n	.242n	.27nX
New Orleans	e	e	e	20.00e	.....	20.00ev	.....	.095ew	.....	.085eB	.095eBL	.1905eB
New York	.....	.....	3.70f	20.99mO	42.95mO	20.99mO	42.94mO	9.61uF	19.01uF	.....	9.68u	19.11u
Philadelphia	.....	.....	.....	22.00US	.....	22.00US	.....	.10UwS	.....	.095US	.....	.....
Pittsburgh	60.00k	98.00m	6.35n	31.20is	.....	31.20is	.....	.1403iS	.....	.142S	.1403i	.....
St. Louis‡‡	.....	.....	.....	19.74f	21.65	.1825f	.1825	.09fw	.092fw	0.165f	.1825O	.30R
San Francisco	.....	70.00	.....	22.50qdd	41.00qdd	22.50qkdd	40.00qkdd	22.50qNdd	46.50qNdd	23.25qWdd	23.50qXdd	2023qXdd
Seattle	.....	.....	.....	24.00s	47.00h	33.00sxcc	38.50	25.50KE	.....	28.75hsY	25.80hsX	49.80hrsX
Toronto	.....	120.00‡t	4.50f	38.90	59.01ee	0.2075	0.2773ee	0.222w	0.2704wee	0.233	0.2122ee	.268Zee

‡ Delivered. # Add 4% sales tax. ## Add 2% intrastate sales tax. R Revised.

PAVING BRICK & BLOCK: *a Less 2% disc. 10th. *b 3 x 3¼ x 8. *c 2¼ x 8¼ x 4. *d Truckload lots. *e Not used. *f 2" interior 6 lb tr. *g Less $1/Mdisc. 15th. *h 2" tr. 8 lb. *i 3 x 3½ x 8½. *j 2½", 6 lb. tr. *k Used. *l Redshale. *m Pine; oak $6.67. *n Truck del. *o Less $1/M disc. 15 days. *p Used: $40; new: $80.

ASPHALTS: *a F.o.b. refinery, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segundo. *e F.o.b. Baton Rouge. *f F.o.b. Hartford, Ill. *g F.o.b. refinery, Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 'penetr. *l Less than 100 penetr. *m 40/300 penetr. *n F.o.b. refinery, Montreal. Fed. tax included; add 6% for mun. & prov. *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 150/300 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks *y F.o.b. Oakland. *z F.o.b. Edmonds. *A F.o.b. refinery, Cleveland, *B F.o.b. Destrehan, La. *E RC. *F Also RC. *G Also MS *H RC 0-5 incl. *I MC 4. *J MC, RC $0.095. *K MC 3, 4, & 5. *L MS. *M MC 1-5, RC 1-5, $0.0918. *N MC 3. *O Truck-load. *P F.o.b. refinery, Atlanta. *Q F.o.b. Eldorado, Ark. *R Delivered within 50 mi. *S Less 2% disc. 10 days, net 30. *T Less 1% disc. 10 days. *U F.o.b. refinery. *V Less 2% disc. 15 days. *W SC 2. *X RS 1. *Y SC 1. *Z Incl. 10% Sales Tax. *aa SC 3, 4, & 5. *bb RS 3. *cc In used drums. *dd less disc of $1 ton. ee 45 Imp. gal. drums *ff 80-150 penetration

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Dec. 15; Next, Jan. 19.
- Clay Products Lime, Plaster, Paint, Roofing: Last, Dec. 22; Next, Jan. 26.
- Wage Rates Building Board Insulation: Last, Dec. 22; Next, Feb. 2.
- Iron & Steel Products, Pipe: Last, Dec. 15; Next, Jan. 12.

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, MARIE MORAVSIK, ELEANOR QUERET, Reports, J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

▲† **Mass., Chicopee Falls**—HOUSING—BA 1/12—Base Procurement Office, Westover Air Force Base, Chicopee Falls, 180 units, Capehart Housing, Westover Air Force Base, IFB 19-617-61-25B. $2,880,000. Pederson & Tilney, 8 Newbury St., Cambridge, archts.

▲ **Mass., Holyoke**—HOUSING—BA 1/26—City Housing Auth., Administration Bldg., Jackson Parkway, 150 unit housing, PHA Mass-5-5&5-4. $1,600,000. Plans deposit $100. William Hoskins Brown, 344 Boylston St., Boston, Mass., archt. CD 11/15.

HEAVY CONSTRUCTION—LB & CA

▲ **CONNECTICUT**—State Hy. Comr., 170 Douglas St., Hartford,

D. V. Frione & Co., Inc., 87 Foxon St., New Haven, Conn. CA $1,917,413, 2,779 ft. hot b. conc. pavement on extension of Danielson Connector, Rte. 12, incl. 4 bridges, 2,000 ft. hot b. conc. pavement of widening Rte. U. S. 6, Federal Air Projects F-159(1) and F-8(7) Projects 68-70 and 68-97, Killingly, Bids Nov. 28. CD 11/30, under LB.

BUILDINGS—LB & CA

▲ **Walter H. Kronenberger & Sons, Inc.**, 8 Longmeadow Drive, Meriden, Conn., Owner Builds, $1,911,000, 78 HOUSES, Meadow Brook Acres, Overlook Rd., MERIDEN, CONN.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
January 26 New York

STREETS AND ROADS
January 11 Delaware January 19 New Jersey
January 26 New York

▲ **N. Y., Flushing** — SPORTS STADIUM — BA 1/24 — Comr. Parks, Arsenal Bldg., Central Park, 63 St. and 5 Ave., New York, Zone 21, Contr. No. Q-99-600(1) general contract, Contr. No. Q-99-760(2) electrical work, Contr. No. Q-99-860(3) heating and ventilating work, Contr. Q-99-960(4) plumbing work, Contr. No. Q-99-1060(5) elevator and moving stair work in connection with Flushing Meadow Sports Stadium, incl. site work, Grand Central Parkway 126 St., Northern Blvd., and Roosevelt Ave., Flushing Meadow Park, Queens Boro. Total cost $15,000,000. Plans deposit $100 general, $10 each mechanical trades. CD 5/3.

BUILDINGS—BA

▲ **Md., Annapolis**—SCHOOL—BA 1/11—Anne Arundel Co. Bd. Educ., 1 story, steel frame school, Quarterfield Rd. and Thelma Ave. $2,500,000. Plans deposit $75. Harder & Dressel, Glen Burnie, archts. CD 11/26/58.

▲ **N. J., Summit**—HIGH SCHOOL—BA 1/24—Bd. Educ., Morris Ave., high school, Kent Pl. Blvd. and Morris Ave. $2,865,000. Plans deposit $50. Frederick A. Elsasser, 2013 Morris Ave., Union, and Miller Fergus & Gelin, 12013 Morris Ave., Union, archts. CD 6/24/59.

▲ **N. J., Elizabeth**—HOSPITAL ADDN.—BA 3/15—St. Elizabeth's Hospital, 204 S. Broad St., 5 story hospital addn., S. Broad St. $5,363,000. Eggers & Higgins, 100 E. 42 St., New York 17, N. Y., archts. (Correction—architects' address). CD 12/16.

HEAVY CONSTRUCTION—LB & CA

▲ **Wolff & Munier, Inc.**, 50 W. 44 St., New York 36, N. Y., CA Est. $3,000,000, air conditioning 32 Avenue of Americas Buildings, NEW YORK, N. Y. New York Telephone Co., 140 West St., New York 7, N. Y. Bids Sept. 30. CD 9/22.

▲ **A. Cestone & Co.**, 710 Bloomfield Ave., Glen Ridge, N. J., LB $2,165,382, est. $3,000,000, (14 bidders), general contract sewage disposal plant, SECAUCUS, N. J. Town, Town Hall, Secaucus, N. J. Homer Smith, Paterson Plank Rd., Secaucus, N. J., engrs. Bid Dec. 19. CD 12/6.

▲† **Samuel N. Zarpas, Inc., & Fullerton Constr. Co.**, Campbells Run Rd., Carnegie, Pa., LB $2,072,000, (17 bidders), 28 bomarc launcher shelters, composite bldg. A &M Bldg. addn. to SOC-TELCO facility, addn. of storage room, modification to heat and power bldg., MOGAS facility and support facilities, McGuire Air Force Base, ENG-30-075-61-69, WRIGHTSTOWN, N. J. U. S. Eng., 111 East 16 St., New York 3, N. Y. Bids Dec. 20. CD 11/18.

▲ **C. J. Langenfelder & Son, Inc.**, 8427 Pulaski Hy., Baltimore, Md., LB $4,410,000, (18 bidders), Susquehanna Water Supply Proj. No. 5, raw water conduit, Rte. 22 to Shure's Landing, BALTIMORE, MD. City, Bureau Water Supply, 3001 Druid Park Dr., Baltimore 15, Md. Bids Dec. 21. CD 12/7.

BUILDINGS—LB & CA

▲ **Planet Constr. Corp.**, 11 W. 42 St., New York 36, N. Y., LB $2,637,000, (3 bidders), general contract JUNIOR HIGH SCHOOL 271, Saratoga Ave., Herkimer and Fulton St., Brooklyn Boro, BROOKLYN, N. Y. Deputy Supt. Schools, Bureau Constr., 42-15 Crescent St., 4 Floor, Long Island City 1, N. Y., Bids Dec. 21. CD 12/5;

D. J. Rice, Inc., 41-50 38 St., Long Island City 1, N. Y., LB $438,425, (3 bidders), heating and ventilating Junior High School 271, Brooklyn Boro, (Brooklyn, N. Y.).

▲ **Planet Constr. Corp.**, 11 W. 42 St., New York 36, N. Y., CA $1,617,000, general contract Phase II, GYMNASIUM, AUDITORIUM and TELEVISION STUDIO addn., George Westinghouse Vocational and Technical High School, Jay, Lawrence and Bridge Sts., Brooklyn Boro, BROOKLYN, N. Y. Deputy Supt. Schools, Bureau Constr., 4 Floor, 42-15 Crescent St., Long Island City 1, N. Y. Bids Nov. 18, awarded Dec. 22. CD 11/23, under LB.

▲ **Rheinstein Constr. Co., Inc.**, 21 E. 40 St., New York 17, N. Y., CA Est. $2,250,000, 100,000 sq. ft. DEPARTMENT STORE, Franklin Ave. between 13 and 14 Sts., GARDEN CITY, N. Y. Saks Fifth Ave., 5 Ave., and E. 49 St., New York 22, N. Y. Awarded early December. CD 11/7.

▲ **Caristo Constr. Corp.**, 26 Court St., Brooklyn 1, N. Y., CA $2,330,000 general contract JUNIOR HIGH SCHOOL 192, Hollis and 111 Aves., 204 and 205 Sts., Queens Boro, HOLLIS, N. Y. Deputy Supt. Schools, Bureau Constr., 42-15 Crescent St., 4 Floor, Long Island City 1, N. Y. Bids Dec. 13. Awarded Dec. 22. CD 12/15, under LB.

▲ **Colmar Constr. Co.**, 364 Gold St., Brooklyn 1, N. Y., CA $4,186,000, general contract HIGH SCHOOL, swimming pool, MOUNT VERNON, N. Y. Bd. Educ., 257 4 Ave., Mount Vernon, N. Y. Bids Dec. 6, awarded Dec. 19. Grand total $6,182,085. CD 12/9, under LB.

Hauxwell & Smith, Inc., 46 Broad St., Port Chester, N. Y., CA $1,278,000, heating and ventilating High School, swimming pool (Mount Vernon, N. Y.).

Lupa Elec. Co., 381A McLean Ave., Yonkers, N. Y., CA $718,085, electrical work High School, swimming pool (Mount Vernon, N. Y.).

▲ **Deputy Supt. Schools, Bureau Constr.**, 42-15 Crescent St., 4 Floor, Long Island City 1, N. Y., cancelled bids to have been opened Dec. 19, general contract, plumbing and drainage, heating and ventilating, electrical work and lighting fixtures at PUBLIC SCHOOL 74, E. 115 St. and 3 Ave., Manhattan Boro, NEW YORK, N. Y. $2,500,000. CD 12/5.

▲ **Gotham Constr. Corp.**, 501 5 Ave., New York 17, N. Y., CA Est. $5,453,000, 322 unit APARTMENT 3.2 acres Boston Rd., Waring, Astor and Holland Aves., Bronx Boro, NEW YORK, N. Y. Chester M. Goldman & Co., Inc., 277 Park Ave., New York 22, N. Y. Brown & Guenther, 1860 Broadway, New York 23, N. Y., archts.

▲ **R. M. Shoemaker Co.**, 245 S. 24th St., Phila., Pa., CA $10,000,000, 2 APARTMENTS, 600 West Ave., etc., JENKINTOWN, PA. R. M. Shoemaker Co., 245 S. 24th St., and W. A. Clarke Mortgage Co., 1518 Walnut St., Phila, Pa. The Ballinger Co., 1625 Race St., Phila, Pa., archt.

▲ **McCloskey & Co.**, 1629 W. Thompson St., Phila., Pa., CA $2,000,000, RESEARCH BLDG., PHILA., PA. Franklin Institute, 20th St. and Parkway, and Phila. Industrial Development Corp., 1421 Chestnut St., Phila, Pa.

▲† **Wepler Constr. Co.**, 118 Needham St., Newton Highlands 61, Mass., LB $1,603,000 (16 bidders) 2 and 3 story BARRACKS, ADMINISTRATION and STORAGE BLDG., MESS HALL KITCHEN, BOILER PLANT and utilities, Army Chemical Center, ENG-18-020-61-7, EDGEWOOD, MD. U. S. Eng., 24 St. and Maryland Ave., Baltimore 18, Md. Bids Dec. 21 CD 11/23.

▲ **Ernest Di Sabatino & Sons, Inc.**, 2601 W. Fourth St., Wilmington, Del., CA $2,000,000, Wilmington COUNTRY CLUB, WILMINGTON, DEL. Wilmington Country Club, Kennett Pike at Kirk Rd., Wilmington, Del. Bils Nov. 9, CD 11/15, under LB.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000; other public works $88,000; Industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of Interest to American contractors.

By Regions & Classes of Construction
(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	Middle West
Middle Atlantic	West of Mississippi
South	Far West

PROPOSED WORK

Water Supply	Public Buildings
Sewers, Waste Disposal	Mass Housing
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to **J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.**

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see **Construction Daily.**

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
January 17 South Carolina

STREETS AND ROADS
January 17 South Carolina

▲ **Ala., Cullman**—BA 1/24—City, City Hall, sewerage treatment plant addn., and lines, $2,000,000. Plans deposit $80. Harry Hendon & Assocs., 10 Office Park Circle, Mountain Brook, and V. H. Padgett & Assocs., P. O. Box 491, Cullman, engrs. CD 10/6.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—Dpt. Hys., 1221 E. Broad St., Richmond, Bids opened 12-21,

Va.—**Thompson-Arthur Paving Co.**, 300 Benbow Rd., Greensboro, N. C., LB $114,061 (7 bidders), grading, paving from Rte. 640 to Rte. 701 on Rte. 662, Proj. 0662-071-102, C501, Pittsylvania Co.; LB $873,646 (3 bidders), 2.848 mi., 2 lanes b. conc. pavement from 0.072 mi. n. Int. Alt. Rte. 29 and 265 mi. s. Va. N.C. state line, Proj. 0029-108-070, C501; 0029-071-104, C501; N.C. Proj. 8.15137 U-UG-109-1(1); F-018-1(9); F-38(9), Pittsylvania Co., Va., and Caswell Co., N. C.;

Va.—**Oman Constr. Co.**, Acklen Park, Memphis Hy., Nashville, Tenn., LB $2,371,404 (15 bidders), grading, paving east section Marion by-pass, Proj. 0081-086-003, G304, B641, B642; 0081-086-003, G-305, B643, B646; 0689-086-105, C501, Smyth Co. CD 10/28.

▲ **GEORGIA**—State Hy. Dpt., 2 Capitol Square S.W., Atlanta,

Ga.—**John L. Burns, Inc.**, Box 2136, Nashville 14, Tenn., CA $3,973,631 8.015 mi. grading paving Interstate Hy. 75, Whitfield and Catoosa Counties;

Ga.—**Shepherd Constr. Co.**, Box 8068 Station F, Atlanta, Ga., and **Southeastern H'way Cont. Co.**, Box 57, Ganiesville, Ga., CA $3,490,666, 6.769 mi. grading, paving, 4 hy. grade separation structures Interstate Hy. 20 DeKalb and Rockdale Counties;

Ga.—**Southeastern H'way Cont. Co.**, Box 57, Gainesville, Ga., and **Lothridge Bros.**, Box 81, Gainesville, Ga., CA $906,385, 7.349 mi. grading paving Ga. State Rd. 2, Towns Co.;

Ga.—**Holliday Constr. Co.**, Greenville, Ga., and **J. Nick Jordan**, 744 E. Morningside Dr. N.E., Atlanta 9, Ga., CA $714,015, 8.045 mi. grading, paving 1 stream bridge, 1 railroad bridge on Georgia State Road 140, Floyd and Bartow Counties. Grand total $9,084,697, Bids Dec. 16, awarded Dec. 22. CD 12/28.

▲† **Hendry Corp.**, 5107 S. West Shore Blvd., Tampa 11, Fla., LB $3,291,210, (16 bidders), modify and deepening entrance channel and turning basin, Port Everglades, CIVENG-08-123-61-34, FLORIDA. U. S. Eng., Box 4970, Jacksonville, Fla. Bids Dec. 21. CD 11/30.

▲† **R. E. Carson, Inc.**, 1930 13 Ave. N., St. Petersburg, Fla., LB $1,736,570, (8 bidders), Precision Trajectory Measurement System, Patrick Air Force Base, ENG-08-123-61-30, COCOA, FLA. U. S. Eng., Box 4970, Jacksonville, Fla. Bids Dec. 20. CD 11/10.

▲ **ALABAMA**—State Hy. Dpt., Montgomery, Zone 4,

George A. Dozier, 4144 Wares Fy Rd., Montgomery, Ala., CA $1,982,938, base and bit. paving 3.291 mi. Belt Line Hy. from U. S 98 N. to Old Shell Rd., Mobile Co. Bids Nov. 8, awarded Dec. 13. CD 11/29, under LB.

▲ **ALABAMA**—State Hy. Dpt., Montgomery, Zone 4, Bids opened 12/16,

Ala.—**Ballenger Paving Co., Inc.**, P. O. Box 2285, Greenville, S. C. & **Southeastern Highway Contr. Co.**, P. O. Box 476, Gainesville, Ga., LB **$1,821,350,** bit. paving 8.581 mi. from Ala. 83 NW of Evergreen NE to Butler County Line on Inter Rte. 65, Conecuh Co.;

Ala.—**McDowell & McDowell,** 718 Murfreesboro Rd., Nashville, Tenn., LB **$858,010,** grading 5.909 mi. from US 431 in Attalla NE toward Etowah County Rd. 57 on Inter, Rte. 59, Prop. B (3.378 mi.) Etowah Co.;

Ala.—**Ed Bentley, Contractor,** Sylacauga, Ala., LB **$716,-351,** grading 5.909 mi. from US 431 in Attalla NE to Etowah County Rd. 57 on Inter. Rte. 59, Proposal A (2.531 mi.) Etowah Co. CD 11/29.

▲ **ALABAMA**—State Hy. Dpt., Montgomery, Zone 4, **Southern Roadbuilders, Inc.,** 2312 Ada Ramp Waldn Rd., Augusta, Ga., CA **$2,347,564,** base and conc. paving, 10.105 mi. from U. S. 11 near Fort Payne NE to Rodgers on Inter Rte. 59, DeKalb Co., Bids Nov. 18, CD 11/29, under LB.

▲† **Hardaway Contr. Co.,** 15 E. 11 St., Columbus, Ga., LB **$7,467,519,** est. $6,304,184, (4 bidders), powerhouse superstructure for Walter F. George Lock and Dam on Chattahoochee River, Fort Gaines, ALABAMA and GEORGIA, U. S. Eng., 2301 Grant St., Mobile, Ala. Bids Dec. 15 CD 12/6.

▲ **Guy H. James Constr. Co,** 4901 N. Sehell St., Oklahoma City, Okla., CA 1.5 mi. earth dikes Logan Martin Dam, Coosa River, near Wetumpka, ALABAMA. Alabama Power Co., 600 N. 18 St., Birmingham, Ala. CD 11/25/53.

▲ **MISSISSIPPI**—State Hy. Dpt., Jackson,

Miss.—**Boyd Constr. Co.,** Box 822, Grenada, Miss., CA **$1,694,204,** est. $2,130,000, 10.703 mi. incid. grade, drain, topping, base and b. conc. pavt. Interstate Hy. 55 between Tillatoba Pope, Hy. Proj. I-55-3(13)219, Yalobusha Co.; CA **$1,734,701,** est. $2,-100,000, 10.642 mi. incid. grade, drain, topping base, b. conc. pavt. Interstate Hy. 55 between Grenada and Tillatoba Hy. Proj. I-IG-55-3(12) 208, Grenada and Yalobusha Counties;

Miss.—**W. E. Blain & Son,** Mount Olive, Miss. and **Ballinger Paving Co., Inc.,** Box 927, Greenville, S. C., CA **$1,178,517,** est. $1,550,000, 5.708 mi. incid. grade, drain, topping, base, conc. and b. conc. pavt. Interstate Hy. 55 between Crystal Springs and Terry-Hy. Proj. I-55-1(12) 7 & I-55-2(27)74, Copiah and Hinds Counties;

Miss.—**Dixie Contractors, Inc.,** Box 3034, Mallory Station Memphis, Tenn., CA **$437,153,** est. $610,000, 9.676 mi. gr., dr., culverts, topping, box bridge Miss. Hy. 35 between Lone Star and Bassfield, Hy. Proj. F-023-1(5) Contr. I and F-023-1(11), Covington and Jefferson Davis Counties;

Miss.—**J. A. Hadley Constr. Co., Inc.,** Box 359, Humbolt, Tenn., CA **$829,486,** est. $1,050,000, 12.21 mi. incid. grd., dr., culvert, topping, base asphalt pavt. US Hy. between Ocean Springs and Gautier Hy. Proj. F-003-1(19), Jackson Co.;

Miss.—**H. J. Happel Co.,** 5501 E. Admiral Blvd., Tulsa, Okla., CA **$1,333,282,** est. $1,200,000, 12.514 mi. incid. gr., dr., base and conc. pavt. US Hy. 49 between Gulfport and Harrison Stone Co. Line, Hy. Proj. F-008-1(11), Harrison Co.;

Miss.—**Mid-State Paving Co.,** Box 1567, Meridian, Miss., CA **$249,938,** est. $290,000, 6.548 mi. incid. gr., dr., topping, base and asphalt paving Miss. Hy. 27 between Georgetown and Utica, Hy. Proj. F-FG-064-1(18), Copiah Co. Grand total $7,257,281. Bids Dec. 20. CD 12/5.

▲ **LOUISIANA**—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, Bids opened 12/21,

Jahncke Service Inc., 814 Howard Ave., New Orleans, La., LB **$3,688,424,** grading drainage structures 6.112 mi. Raceland-Des Allemands Hy. Rte. LA-US 90.SP No. 5-07-29, FAP No. F-216(13), Lafourche Parish. CD 12/6.

LOUISIANA—State Dpt. Hys., Rm. 426, Headquarters Admin. Bldg., Baton Rouge, Bids opened 12/21,

La.—**O. L. Sims Co. of Louisiana,** Box 1651, Hattiesburg, Miss., LB **$2,921,144,** (2 bidders), c. conc. 0.336 mi. Baton Rouge Interstate Rte. I-410, SP 450-33-33 Fed. 1-410-3(9) 103, East Baton Rouge Parish;

La.—**T. L. James & Co., Inc.,** Ruston, La., LB **$179,-717,** (2 bidders), grading, aggreg. type base course 4.328 mi. Bridge City-Westwego Hy., Rte. 541, SP 826-05-02, Jefferson Parish; LB **$426,788,** (2 bidders), wid'n existing roadway 8.914 mi. Robert-Covington Hy., Rte. 190, SP 13-10-24, St. Tammany Parish, CD 12/6;

▲ **TENNESSEE**—State Hy. Dpt., Nashville,

Tenn.—**Burns & Baker,** 726 16th Ave. S., Nashville, CA **$1,128,669,** cr. stone, Proj. I-40-3-(23)170, Dickson Co.;

Tenn.—**L. A. Contracting Co.,** Hgy. 49, N. Bypass, Box 1651, Hattiesburg, Miss., CA **$1,156,256,** conc. cal. chl., tr. bd. gr or ch. surf. rdwy., Proj. I-40-1(24)41, Fayette and Haywood Counties;

Tenn.—**Oman Constr. Co., Inc.,** Acklen Park, Nashville, Tenn., CA **$2,649,889,** conc. cal. chl, CSBCB, ACSC, Proj. I-24-3-(15)128, Hamilton Co.;

Tenn.—**Mid-South Pavers, Inc., and Ralph Rogers & Co., Inc.,** 720 Argyle Ave., Nashville, Tenn., CA **$700,283,** CSBCB, ACSC, 6 in. con. underdrain, Proj. I-40-7-(21)372, Knox Co.;

Tenn.—**Tennessee Asphalt Co.,** Knoxville, Tenn., CA **$897,099,** conc. cal. chl., CSBCB, ACSC, 6 in. con. underdrains, Proj. I-40-7(22)377, Knox Co.;

Tenn.—**A. B. Long, Inc.,** Harriman, Tenn., CA **$1,599,-733,** conc. cal. chl., Proj. I-75-3-(9)87 and I-640-7 (18) 388, Knox Co.;

Tenn.—**Clinchfield Concrete & Constr. Co.,** Wexler St., Kingsport, Tenn., CA **$1,396,629,** tr. bd. grav. or chert surf. rdwy., Proj. I-40-1(27)79, Madison Co.;

Tenn.—**Oscar Damron,** Columbia, Tenn., CA **$352,422,** crushed slag, Proj. S-6252-(1), Maury Co., CD 11/21;

Tenn.—**J. W. Owen, Inc.,** 1587 Chelsea Ave., Memphis, Tenn., CA **$905,794,** conc. cal. chl, gravel or chert Proj. I-240-1(28)18, Shelby Co.;

Tenn.—**Weymouth Constr. Co.,** 2174 E. Person Ave., Memphis, Tenn., CA **$1,038,814,** con. cal. chl., gr. prch., ACSC, Proj. I-240-1(29)25, Shelby Co.;

Tenn.—**John L. Brinkley & Sons Constr. Co.,** Shelbyville, Tenn., CA **$806,018,** conc. cal., chl. CSBCB, ACSC, Alt. "B", Br., Br. No. 1 and 4, Proj. I-62-2 (5)62 and F-070-2(2), Williamson Co.;

Tenn.—**J. D. Campbell & Co.,** Benton, Tenn., CA **$124,-967,** conc. calchloride, Proj. SP-740-E, Robertson Co., Grand Total $12,631,606. Bids Dec. 9. CD 12/15, under LB.

BUILDINGS—LB & CA

▲ **State Dpt. Hygiene & Hospitals,** State Office Bldg., Richmond, Va., rejected bids Dec. 14, Acute Treatment Bldg. No. 1, Acute Treatment Bldg. No. 2, Acute Treatment Bldg. No. 3, Acute Treatment Bldg. No. 4, Eastern State Hospital, WILLIAMSBURG, VA. New bids Dec. 29. CD 12/21, under LB.

▲ **Allan M. Campbell Co.,** Box 3269, Orlando Fla., CA **$4,792,000,** County OFFICE and JAIL, CLEARWATER, FLA. Pinellas County, 305 Haven St., Clearwater, Fla., Bids Dec. 6. CD 12/9, under LB.

▲ **Richard Constr. Co.,** 645 NW 7th Ave., Fort Lauderdale, Fla., LB **$1,583,000,** (7 bidders), new SENIOR HIGH SCHOOL "C" (Mainland) Daytona Beach, DELAND, FLA. Volusia County Bd. Pub. Instruction, 230 North Stone St., Deland, Fla. Bids Dec. 20. CD 12/2.

▲ **Inter-American Center Auth.,** Miami International Airport, Miami, Fla., rejected bids Nov. 22, TRADE and CULTURAL CENTER, incl. dredging, fill bulkhead, paving, water and sewer lines, exhibition bldg., MIAMI, FLA. LB **$15,483,000,** alternate 1, **$18,-921,000** alternate 2. CD 11/29, under LB.

▲ **Brice Bldg. Co., Inc.,** 1021 Second Ave. N., Birmingham, Ala., CA **$2,000,000,** 185,000 sq. ft. Heart of Huntsville SHOPPING CENTER, E. Memorial Parkway, HUNTSVILLE, ALA. Engert Corp., 1921 1 St. Ave., Birmingham, Ala. Bids Nov. 22, CD 11/29, under LB.

▲ **Bradley & Watts,** 272 S. MacGregor Ave., Mobile, Ala., Owner Builds, **$1,500,000,** 100 RESIDENCES, MOBILE, ALA.

▲ **F. W. Owens Co., Inc.,** 119 N. 5 St., Louisville, Ky., CA **$2,005,000** general contract Shawnee HIGH SCHOOL addn., LOUISVILLE, KY. Louisville Bd. Educ., 5 and Hill St., Louisville, Ky. Bids Nov. 2. CD 11/4, under LB.

▲ **Al J. Schneider Constr. Co.,** 3720 7th St. Rd., Louisville, Ky., LB **$2,637,000,** general contract, Atherton HIGH SCHOOL, Dundee Rd., LOUISVILLE, KY. Louisville Bd. Educ., 5 and Hill Sts., Louisville, Ky. Bids Dec. 14. CD 9/22.

▲† **General Electric Co.,** River Rd., Schenectady, N. Y., CA **$30,400,000,** two 800,000 kw. steam powered TURBO GENERATORS, TENNESSEE. Tennessee Valley Authority 410 Union Ave., Knoxville, Tenn. CD 11/22, under LB.

▲† **Paul Tishman Co.,** 21 E. 70th St., New York, N. Y., CA **$8,512,987,** COURTHOUSE and FEDERAL OFFICE, Proj. 40906, MEMPHIS, TENN. General Services Admin., Peach Tree-Seventh Bldg., Atlanta, Ga. Bids Nov. 22. CD 11/25, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **O., Cleveland**—RESEARCH—BA 1/17—Western Reserve University, 2040 Adelbert Rd., Zone 6, (selected list of bidders) research bldg. for medical school, $5,000,000. Schafer, Flynn & Williams, 1740 E. 12th St., Zone 14, archts. CD 7/2/59.

BUILDINGS—BA

▲ **Mich., Livonia**—SCHOOL—BA 1/12—Bd. Educ., 15125 Farmington Rd., high school, Joy Rd. between Middle Belt and Merriman Rds. $3,400,000. Chas. W. Lane Assocs., 3366 Washtenaw, Ann Arbor, Mich., archts. CD 8/4.

▲ **O., Columbus**—DORMITORY—BA 1/24—Dpt. P. Wks., State Depts. Bldg., Zone 15, Dormitory F for women, Ohio State University, $1,500,000. Plans deposit $25. C. E. Bentz, c/o owner, archt. CD 7/13.

HEAVY CONSTRUCTION—LB & CA

▲ **Hunkin-Conkey Constr. Co.,** 1740 E. 12th St., Cleveland 14, O., LB **$2,836,012,** est. $3,235,000, (6 bidders), Contract II, treatment plant, Rocky River sewer plant expansion, Rocky River, CLEVELAND, O. Bd. Comrs. Cuyahoga Co., 451 County Admin. Bldg., 1219 Ontario St., Cleveland 13, O. Bids Dec. 15. CD 11/10;

Merritt-Chapman Scott Corp., Standard Bldg., Cleveland 13, O., LB **$342,340,** est. $312,900, (2 bidders), Contract No. 1, outfall sewers, Rocky River (Cleveland, O.).

▲ **INDIANA**—State Hy. Dpt., State Office Bldg., Indianapolis, Bids opened 12/20,

Ind.—**Dyer Constr. Co.,** 1716 Sheffield Ave., Dyer, Ind. LB **$1,118,362,** est. $1,302,560, (6 bidders), rein.-con. pavement. Contract R 5176;

Ind.—**Calumet Paving Co.,** 96th and Zionsville Rd., ZionsviHe, Ind., LB **$1,834,556,** est. $2,194,117, (12 bidders), rein.-con. pavement, Contract R 5197;

Ind.—**George M. Eady Co. & Codell Constr. Co.,** 340 Byrne St., Louisville, Ky., LB **$1,642,393,** est. $2,249,795, (12 bidders), rein.-con. pavement. Contract R 5198;

Ind.—**Berns Constr. Co.,** 312 E. Washington St., Indianapolis, Ind., LB **$1,346,212,** est. $1,646,551, (7 bidders), rein.-con. pavement, Contract R 5199;

Ind.—**Ryan Constr. Co.,** 800 E. Michigan St., Evansville, Ind., LB **$1,731,815,** est. $2,136,973, (5 bidders), rein.-con. pavement, rein.-con. structure, Contract R 5202. CD 12/6.

▲ **MICHIGAN**—State Hy. Dpt., 732 Mason Bldg., Lansing, Zone 26,

Mich.—**S. D. Solomon & Sons,** 3760 Elizabeth Lake Rd., Pontiac, Mich., CA **$3,573,564,** 4.8 mi. freeway from Walton Blvd. northwesterly to Baldwin Rd. incl. five bridges on US 10 relocation also interchange ramp, Oakland Co.; CA **$4,012,804** 7.434 mi. dual conc. pavt. and two bridges on I-75, Oakland Co.;

Mich.—**L. A. Davidson,** 213 E. St. Joseph St., Lansing, Mich., CA **$1,528,187,** 2.7 mi. freeway and three bridges from Fenton-Clio freeway south of Flint easterly to Fenton Rd., Genesee Co.; CA **$2,284,656,** 5.796 mi. dual 24 ft. conc. pavt. three bridges, ramps and service roads on I-96, Livingston Co.;

Mich.—**Holloway Constr. Co.,** 29350 Joy Rd., Livonia, Mich., CA **$2,829,659,** 4.763 mi. dual 24 ft. concrete pavt. and two bridge structures on US 16 reloc. from M-100 southeast, Clinton Co.;

Mich.—**Canonie Constr. Co.,** South Haven, Mich., CA **$1,884,605,** 2.62 mi. dual 24 ft. conc. pavt. and four bridges on US 16 reloc. Eaton and Clinton Counties, CA **$922,0**[illegible] 0.912 mi. grading and two structures on US 23 reloc., Washtenaw Co.;

Mich.—**W. H. Knapp,** Box 593, Monroe, Mich., CA **$2,239,016,** 3.6 mi. dual conc. pavt. and three structures on US 10 reloc., Midland Co.;

Mich.—**Pierson Contg. Co.,** 200 Eddy Bldg., Saginaw, Mich., CA **$3,952,575,** 7.067 mi. dual pavt. and five structures on US-10 reloc., Midland Co.;

Mich.—**Sargent Constr. Co.,** 2840 Bay Rd., Saginaw, Mich., CA **$1,714,545,** 3.113 mi. dual 24 ft. concrete pavt. and four structures on US-27 reloc., Isabella and Clare Counties;

Mich.—**Holloway Conustr. Co.,** 29350 Joy Rd., Livonia, Mich., CA **$2,456,140,** 5.806 mi. dual 24 ft. conc. pavt. and one structure on US-27 reloc., Clare Co.;

Mich.—**Johnson-Greene Co.,** 416 E. Huron St., Ann Arbor, Mich., CA **$1,743,046,** 5.385 mi. dual aggreg. base and three structures on I-75, Otsego Co.; CA **$2,943,787,** 8.718 mi. dual b. conc. wearing course and five structures on US 27 reloc. from Gaylord north, Otsego Co.;

Mich.—**Canonie Constr. Co., South Haven, Mich.** and **Carl Goodwin & Sons,** 500 Delano St., Allegan, Mich., CA **$724,987,** 2.244 mi. 60 ft. and 8 ft. conc. pavt. on US 12 from Benton Harbor to US 12 bypass, Berrien Co.;

Mich.—**Alpine Constr. Co.,** 245 Marquette, St. Ignace, Mich., CA **$1,233,498,** six tenths of mile Interstate 75 from Easterday Ave. north to Eureka St. leading to approaches to International Bridge at Saulte Ste. Marie in Soo, Chippewa Co.;

Mich.—**Smith Brothers,** Cassopolis, Mich., CA **$615,-959,** 7.36 mi. grading, drainage structures and double seal on M-89 from Plainwell, Allegan Co. to Kalamazoo, Kalamazoo Co., Kalamazoo and Allegan Counties;

Mich.—**Darin & Armstrong, Inc.,** 2041 Fenkell, Detroit, Mich., CA **$1,666,545,** ¾ mi. grading, drainage, two roadways, retaining walls, alterations to lighting, water mains and sewers on James Couzens Hy., Detroit, Wayne Co.;

Mich.—**L. W. Edison Co.,** 3134 Midland Dr. S. E., Grand Rapids, Mich., CA **$3,322,630,** 8.346 mi. dual 24 ft. conc. pavt. and three bridges on US 23 reloc. from I-96 north, Livingston Co. Bids Dec. 7, awarded Dec. 20. Grand total $39,648,295. CD 12/15, under LB.

▲† **A. S. Wikstrom Co., Inc.,** Box 217 Skaneateles, N. Y., CA **$4,947,950,** First Stage, remove existing lock, build cofferdams, east and west centerpiers, access bridge, etc. remove existing Poe Lock, St. Mary's River, Sault Ste. Marie, CIVENG-20-064-61-19, MICHIGAN. U. S. Eng., 1101 Washington Blvd., Detroit 25, Mich. Bids Dec. 9. CD 12/14, under LB.

BUILDINGS—LB & CA

▲ **Hunkin-Conkey Constr. Co.,** 1740 E. 12th St., Cleveland 14, O., LB **$1,924,000,** general contract Proj. OH 3-17A, 272 unit low rent HOUSING, north side Hough Ave. and east side Ansel Rd., CLEVELAND, O. Cleveland Metropolitan Housing Auth., 1325 W. 28th St., Cleveland 13, O. Bids Dec. 21. CD 11/17.

▲ **Knowlton Constr. Co.,** 1133 W. Columbus St., Bellefontaine, O., CA **$1,736,415,** general contract DUNBAR HIGH SCHOOL, DAYTON, O. Bd. Educ., 348 W. 1st St., Dayton, O. Bids Dec. 20. CD 11/21.

The Huffman-Wolfe Co., 19 W. 4th St., Dayton, O., CA **$444,444,** heating and plumbing contract, Dunbar High SCHOOL (Dayton, O.).

▲ **J. L. Simmons Constr. Co.,** 2140 Woodford St., Decatur, Ill., CA **$1,757,700,** 5 point residence halls, COLLEGE, CARBONDALE, ILL. Southern Illinois University, Carbondale, Ill. CD 12/1, under LB.

▲ **Superior Constr. Co., Inc.,** 2045 E. Dunes Highway, Gary, Ind., CA **$2,500,000,** TELEPHONE EXCHANGE, 4th and John Sts., CHAMPAIGN, ILL. Illinois Bell Telephone Co., 225 S. 4th St., Springfield, Ill. Holabird & Root, 180 N. Wabash Ave., Chicago 1, Ill., archts.

▲ **Felmley-Dickerson Co.,** 311 E. Lafayette St., Bloomington, Ill., CA **$2,657,000,** COLLEGE DORMITORY and DINING HALL, Northern University, DEKALB, ILL. State Teachers College Bd., State Office Bldg., Springfield, Ill. Bids Nov. 3. CD 11/29, under LB.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

January 20 Missouri January 20, 21 Texas

STREETS AND ROADS

January 11 Arkansas January 20 Missouri
January 21 Texas

▲ **Wyo., Casper**—BA 1/12—City, City Hall, road imprvs. Contract Areas Nos. 1, 2, 3, 4, 5 and 6, Local Assessment Dist. No. 1960. Plans deposit $85. Harold Hoskins & Assocs., 1403 E. Yellowstone Ave., engrs. CD 5/11/59.

▲† **Tex., Wichita Falls**—HOSPITAL—BA 1/26—U. S. Eng., 100 West Vickery, Fort Worth, 300/300 bed hospital and facilities, Sheppard Air Force Base, ENG-41-443-61-18, $4,500,000. Extended date. Restricted to small businesses. Roscoe De Witt, 2025 Cedar Springs Rd., Dallas, archt. CD 11/10.

▲† **Missouri**—BA 2/2—U. S. Eng., 420 Locust St., St. Louis, Zone 2, levee, floodwall and sewer alterations, Items L-3-A, L-4, L-5, F-3, F-4 and S-7A, Flood Protection, St. Louis, CIVENG-23-065-61-44. $2,500,000. CD 9/21.

BUILDINGS—BA

▲ **Tex., Spring Branch**—SCHOOL—BA 1/23—Spring Branch Ind. School Dist., 9000 Westview St., Houston, Senior High School $2,600,000. Plans deposit $50. Koetter & Tharp, 2302 Richmond Ave., Houston, archts. Walter P. Moore, 2 Pinedale St. and H. C. Will, 5017 Winetka St., Houston, engrs. CD 10/19.

▲ **S. D., Rapid City**—ACADEMY, etc.—BA 1/24—Benedictine Sisters of St. Martin, Sturgis St., St. Martin Academy and Convent, $3,000,000. Plans deposit $50. Extended date. Mark Pfalior & Assoc., Inc., 7613 W. State St., Milwaukee, Wis., archts. CD 11/30.

HEAVY CONSTRUCTION—LB & CA

▲ **MISSOURI**—State Hy. Dpt., Jefferson City, Mo.—**Fred Weber Contr. Inc.**, 7929 Alabama Ave., St. Louis 11, Mo., CA **$338,078** grade, culverts 2-24 ft conc. pavts. 0.282 mi. Franklin Co.; CA **$2,676,532**, grade culverts, 2-24 ft. conc. pavts. 3.414 mi., St. Louis Co.; CA **$2,912,437** grade, culverts, 2-24 ft. conc. pavts. 5.041 mi. St. Louis Co.; CA **$123,354** traffic signs, Rte. 1 70 north to Dunn Rd., St. Louis Co.; CA **$178,758** grade, culverts, 2-24 ft. conc. pavts. 0.399 mi. St. Louis Co.;
Mo.—**Joseph L. Pohl, Contr.**, Nevada, Mo., CA **$947,042** grade, culverts, 2-24 ft. conc. pavts. 3.224 mi., Lafayette Co.; CA **$856,184** grade, culverts, 2-24 ft. conc. pavts. 2.992 mi. Saline Co.;
Mo.—**Jos. L. Pohl, Contr.**, Nevada, Mo. and **Emmet V. Brasnahan**, Harrisonville, Mo., CA **$2,034,078**, gr. earth, culverts, 2-24 ft. conc. pavts. 4.998 mi. Saline Co.;
Mo.—**Interstate Constr. Corp.**, 3621 Troost Ave., Kansas City, Mo., CA **$105,799**, grading, storm sewers 0.136 mi., Jackson Co. Grand total $10,172,222. Bids Dec. 7, awarded Dec. 9. CD 12/15, under LB.

▲ **Clarkson Constr. Co.**, 4133 Gardner, Kansas City, Mo., CA **$1,889,579**, rebuilding 23 Street viaduct, KANSAS CITY, MO. City, Dpt. P. Wks., City Hall, Kansas City, Mo. CD 12/2, under LB.

▲† **Hardaway Contg. Co.**, 15 E. 11 St., Columbus, Ga., **Oman Constr. Co., Inc.**, Acklen park, Nashville, Tenn., **R. P. Farnsworth Co., Inc.**, 1515 S. Salcedo St., New Orleans, La., **Wright Contg. Co.**, Brookhaven Rd., Columbus, Ga., CA **$28,695,115**, construction of Titan Missile Launch Facilities, Little Rock Missile Base, LITTLE ROCK, ARK. U. S. Eng., Ballistic Missile Construction Office, 9610 Bellanca Ave., Inglewood, Calif., Bids Dec. 20. CD 12/22, under LB.

▲ **Missouri Pacific R. R. Co.**, W. H. Hobbs, ch. engr., Missouri Pacific Bldg., St. Louis 3, Mo., Owner Builds, **$6,000,000**, electronically operated car classification yard, McGEHEE, ARK. CD 7/26.

▲ **Lock Joint Pipe Co.**, 2101 NE 10 St., Oklahoma City, Okla., and **Okatoka Constructors, Inc.** (Tecon Constr. Co., Dallas, Tex., Standard Industries, Inc., Tulsa, Okla., Metropolitan Paving Co., and Gill Constr. Co., Oklahoma City, Okla.), Republic Bldg., Oklahoma City, Okla., CA **$49,498,839**, 98 mi. 60 in. water pipe line and accessories, OKLAHOMA CITY, OKLA. Oklahoma City Municipal Improvement Authority, First National Bldg., Oklahoma City, Okla. CD 12/19, under LB.

▲ **MONTANA**—State Hy. Comn., Helena, Bids opened 12/21,
Bud King Constr. Co., Missoula, Mont., and McLaughlin Inc., Ford Bldg., Great Falls, Mont., LB **$3,134,695**, 11.8 mi. double lane roads around Livingston, Park Co. CD 12/7.

▲ **Northwestern Engineering Co.**, 6001 Dexter St., Denver, Colo., CA **$1,818,000**, site preparation runway and taxiway system, Stapleton Air Field, Proj. No. 9-05-010-23, Unit No. 2, DENVER, COLO. City & County of Denver, City & County Bldg., Denver, Colo., Bids Nov. 29, awarded Dec. 19. CD 12/5, under LB.

BUILDINGS—LB & CA

▲ **George L. Cousins Contg. Co.**, 875 N. Skinker Blvd., St. Louis 30, Mo., CA Est. **$2,000,000**, 15 story APARTMENT, parking, swimming pool, 230 S. Brentwood Blvd., CLAYTON (ST. LOUIS 5 P. O.), MO. 230 S. Brentwood Inc., c/o W. Z. Oxenhandler, Coronet Bldg., 225 S. Meramec Ave., Clayton 5, Mo. (Correction—contractor). CD 7/22, under CA.

▲ **Rust Engineering Co.**, 930 Fort Duquesne Blvd., Pittsburgh, Pa., CA 2,100,000 bu. GRAIN ELEVATOR, KANSAS CITY, MO. Missouri Farmers Assoc., Board of Trade Bldg., Kansas City, Mo. Horner & Wyatt, Dwight Bldg., Kansas City, Mo., consult. engrs.

▲† **Del E. Webb Corp.**, Box 4066, Phoenix, Ariz., LB **$6,543,100**, 400 Capehart Act Family DWELLINGS, Unit 4, Offutt Air Force Base, Omaha, ENG-25-0600-61-42. FORT CROOK, NEB. Base Procurement Office, Offutt Air Force Base, Fort Crook, Neb. CD 11/15.

▲† **Senora Corp.**, First National Bank Bldg., Tulsa, Okla., CA **$1,851,127**, PETROLEUM RESEARCH CENTER, for Dpt. Interior, Bureau Mines, BARTLESVILLE, OKLA. General Services Admin., 1114 Commerce St., Dallas, Tex. Bids Nov. 17. CD 11/21, under LB.

▲ **Manhattan Constr. Co.**, Manhattan Bldg., Muskogee, Okla. CA **$2,200,000**, RESEARCH LABORATORY enlargement, RESEARCH SERVICES, PONCA CITY, OKLA. Continental Oil Co., Ponca City, Okla., and 1300 Main St., Houston, Tex. Bids Dec. 6. CD 11/16.

▲ **McMillan Home Builders**, 5331 Brookmeade St., Houston, Tex., Owner Builds, **$1,845,000**, 41 DWELLINGS, near Katy County Rd., HOUSTON, TEX.

▲† **U. S. Eng.**, Box 1538, Albuquerque, N. M., cancelled bids to have been opened about Jan. 20, 158 x 30 ft. steel frame, con. walls, masonry interior partitions, discrimination radar bldg., White Sands Missile Range, ENG-29-005-61-47, LAS CRUCES, N. M. **$1,500,000.** CD 12/20.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

January 24 Washington January 25 California

STREETS AND ROADS

January 19, 25 California

BUILDINGS—BA

▲ **California**—TUNNEL PAVING—BA 2/1—State Div. Hys., 1120 N St., Sacramento, grading, paving to constr. approaches to Oregon Mountain Tunnel on U.S. Hy. 199 at Hazelview Summit, Del Norte Co. $2,955,000. CD 6/6.

▲ **Calif., San Mateo**—COLLEGE BUILDINGS—BA 2/15—San Mateo Junior College Dist., Coyote Point Campus, San Mateo, constr. ten major bldgs. to provide 412,700 sq. ft. classroom, administration, library and gymnasium space, Campus of College of San Mateo. Est., $10,000,000. Constr. 1962. CD 11/17.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,
Guy F. Atkinson Co., 10 West Orange Ave., South San Francisco, Calif., CA **$4,897,617**, eight lane freeway viaduct and grading, surf. ramps and structures on Santa Monica Freeway between Vermont Ave. and 1/10 mi. east of Oak St. in Los Angeles, Los Angeles Co. Bids Dec. 8, awarded Dec. 23. CD 12/14, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,
Griffith Co., 1060 South Broadway, Los Angeles, Calif., CA **$6,668,846**, grading, paving to constr. 3.5 mi. 8 lane freeway on San Diego Freeway between 174 St. in Torrance and 190th St. in Los Angeles, Incl. 8 traffic separation bridges, Los Angeles Co. Bids Dec. 15, awarded Dec. 23. CD 12/21, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 South Spring St., Los Angeles, Bids opened 12/22,
Sully-Miller Contg. Co., 3000 E. South St., Long Beach, Calif., LB **$4,349,750** (6 bidders), grading, paving to constr. 4.2 mi. 4 lane freeway on Newport Freeway (State Sign Rte. 55) between just south of Chapman Ave. in Orange and Riverside Freeway to North, incl. 11 traffic separation structures and bridges, Orange Co. CD 11/10.

▲ **American Bridge Div. U. S. Steel Corp.**, 6045 East Slauson Ave., Los Angeles, Calif., CA **$1,573,000**, furnishing fabrication and erection structural steel passenger cargo terminal bldg. at Berths 93-A and 93-B, San Pedro, LOS ANGELES, CALIF. Los Angeles City Bd. Harbor Comrs., Branch City Hall, San Pedro, Calif. Bids Nov. 1. CD 11/4, under LB.

▲† **Franks Dredging**, P.O. Box 227, Long Beach, Calif., LB **$2,297,440** (4 bidders), dredging for carrier berthing facility, Naval Air Station, North Island, Spec. 25397, SAN DIEGO, CALIF. 11th Naval Dist. P. Wks., 1220 Pacific Hy., San Diego 1, Calif. Bids Dec. 22. CD 12/16.

▲ **Raymond International, Inc.**, 140 Cedar St., New York 6, N. Y., **Healy-Tibbitts Constr. Co.**, 411 Brannon St., San Francisco 7, Calif., and **Utah Constr. Co.**, 100 Bush St., San Francisco, Calif., LB **$17,329,830**, First Phase, dredging, sand and rock facing, seawall for Port Terminal Proj., SAN FRANCISCO, CALIF. San Francisco Port Auth., Ferry Bldg., San Francisco, Calif. Bids Dec. 19. CD 10/12/59.

▲ **Stolte, Inc. & Lee Stephens**, 8451 San Leandro St., Oakland, Calif., LB **$2,206,944**, El Dorado and Center St. overpasses, STOCKTON, CALIF. City, City Hall, Stockton, Calif. Bids Dec. 12. CD 12/1.

BUILDINGS—LB & CA

▲† **Lembke Constr. Co., Inc.**, 1719 5 N.W., Albuquerque, N. M., CA **$1,957,289**, construction two enlisted men's BARRACKS, ADMINISTRATION and SUPPLY BLDG. and MESS HALL, FORT HUACHUCA, ARIZ. U. S. Eng., 71 S. Figueroa St., Los Angeles, Calif. Bids Oct. 26. CD 11/1, under LB.

▲ **Hoffman Constr. Co.**, 715 SW Columbia St., Portland, Ore., CA Est. **$5,000,000**, PULP PLANT addn., WALLULA, WASH. Boise Cascade Corp., Wallula, Wash. CD 6/27.

▲ **Beckner Constr. Co.**, 2650 River Ave. South, San Gabriel, Calif., LB **$2,167,950** (8 bidders), Savannah HIGH SCHOOL, ANAHEIM, CALIF. Anaheim Union High School Dist., 123 North Citron Ave., Anaheim, Calif. Bids Dec. 20. CD 11/29.

▲ **Alcan-Pacific Co.**, 1921 Stockton Blvd., Sacramento, Calif., LB **$3,549,000**, 230 unit CAPEHART HOUSING, incl. streets, sidewalks, sewage, utilities, etc., BEALE AIR FORCE BASE, CALIF. Base Procurement Office, Bldg. 2529, Beale Air Force Base, Calif. Bids Dec. 8. CD 12/1.

▲ **Kemp Brothers**, 8750 Mettler St., Los Angeles, Calif., CA **$2,437,000**, Lowell HIGH SCHOOL, near La Habra, FULLERTON, CALIF. Fullerton High School Dist., 1000 North Harvard Ave., Fullerton, Calif. Bids Nov. 7. CD 11/10, under LB.

▲ **Monterey Mechanical Co.**, 8275 San Leandro St., Oakland 21, Calif., CA **$2,178,467**, mechanical work 562,400 sq. ft. HEADQUARTERS OFFICE, Dpt. Motor Vehicles, SACRAMENTO, CALIF. State Dpt. P. Wks., 1120 N St., Sacramento, Calif. Bids Dec. 13, awarded Dec. 19. Grand total $3,766,319;
Patterson-Emerson-Comstock, Inc., 3247 Grand Ave., Oakland 10, Calif., CA **$985,518**, electrical work Headquarters Office, Dpt. Motor Vehicles (Sacramento, Calif.);
Valley Elevator Co., 1606 D St., Sacramento 14, Calif., CA **$602,334**, dumbwaiters and electric stairways and elevators Headquarters Office, Dpt. Motor Vehicles (Sacramento, Calif.).

▲ **Kemp Bros.**, 8750 Mettler St., Los Angeles, Calif., CA **$2,578,000**, HIGH SCHOOL NO. 7, WHITTIER, CALIF. Whittier School Dist., 902 West Washington Blvd., Whittier, Calif. Bids Nov. 17. CD 11/22, under LB.

▲ **Centex Constr. Co.**, Kaneohe Bay Dr., Kailua, Oahu, Hawaii, Owner Builds, **$1,800,000**, 104 HOMES in Kailua, HONOLULU, HAWAII. R. Milam, c/o contractor, archt. CD 6/26/58.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

January 18 Ontario

STREETS AND ROADS

January 18 Ontario

▲ **Manitoba**—BA 1/24—Manitoba Hydro Electric Bd., P. O. Box 815, Winnipeg, Grand Rapids Generating Station. Total est. $140,000,000. Plans deposit $100. Extended date. CD 12/12.

BUILDINGS—LB & CA

▲ **Emery Engineering & Contracting Co., Ltd.**, 5 Bayfield St., Barrie, Ont., CA Est. **$1,930,000**, structural steel, part precast concrete, brick, poured concrete HOSPITAL expansion, BARRIE, ONT. Royal Victoria Hospital Bd., Barrie, Ont. Bids Dec. 1. CD 11/16.

PUERTO RICO

BUILDINGS—BA

▲† **Puerto Rico, Fort Allen**—HOUSING—BA On Or About 2/9—U. S. Eng., P. O. Box 4970, Jacksonville 1, Fla., U. S. A., 150 units Capehart Housing, ENG-08-123-61-40. **$2,170,100. CD 2/22, under LB.**

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲† **NICARAGUA**—Bureau P. Rds., Dpt. Commerce, Inter-American Hy. Office, 18 and F Sts. N. W., Wash., D. C., U. S. A., Bids opened 12/15,
Nello L. Teer Co. of Central America, P. O. Box 1131, Durham, N. C., U. S. A., LB **$2,046,395**, (3 bidders), 14 mi. grading, drainage, special subbase Rama Rd., Proj. R-3D, End Proj. R-3B to Siquia River. CD 11/16.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲ **AUSTRALIA**—BA 3/1—Queensland State Govt., Brisbane,
bridges and culverts on Mount Isa-Townsville Railway Proj. between Hughenden and Duchess to incl. 92 bridges and 220 culverts. $6,800,000. Plans deposit $34. Ford, Bacon & Davis, Inc., Box 443F, G.P.O., Brisbane, Queensland, Australia, engr.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Ill., Bloomington**—City, City Hall, WW system imprvs., incl. second supply lake, **$2,000,000**; 4 in. water mains, W. Washington St. and main imprvs. other parts of city, **$1,214,000.** CD 8/11/50.

(Continued on page 62)

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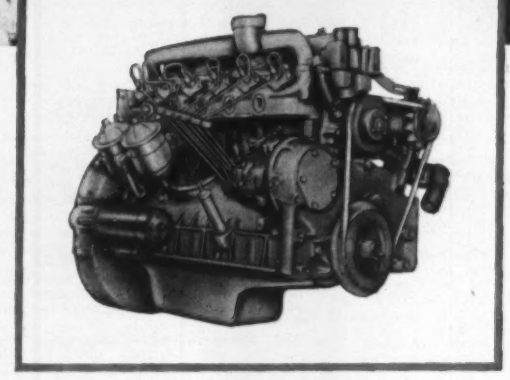

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(Continued from page 60)

▲ **N. C., Jacksonville**—City, City Hall, bond election Feb. 7, water system imprvs., sanitary sewer imprvs. $1,300,000. William F. Freeman, Inc., 116 Commerce St., High Point, consult. engr. CD 11/17/59, under Water Supply.

▲ **Tex., Wichita Falls**—City, City Hall, voted bonds Dec. 8, reservoir dam, $6,100,000; water main and distr. lines, $3,000,000; water pump station, $750,000; water storage tanks, elevated, $400,000; water treatment plant, $750,000; waterworks exten., $3,000,000, Halsell Water Supply Dist. near between Henrietta and Scotland. Biggs & Matthews, 4007 Faith Rd., Wichita Falls, and Homer A. Hunter Associates, 3708 Abrams Rd., Dallas, Tex., consult. engrs. CD 11/30.

SEWERS, WASTE DISPOSAL

▲ **Ill., Collinsville**—City, City Hall, $1,570,000 bond election Mar. 4, sewer imprvs., extensions, sewage disposal plant. J. C. Stevens & Assocs., St. Louis Rd., Collinsville, consult. engrs. CD 1/22.

▲ **Ill., Creve Coeur (Peoria P. O.)**—Village, Village Hall, and Greater Creve Coeur Sanitary Dist., 356 Lawnridge Dr., defeated, $450,000 bonds for village and $550,000 bonds for sanitary district, sanitary sewerage system incl. sewage disposal plant and sewer lines, $2,300,000. CD 11/17.

▲ **Mich., Muskegon**—Norton Twp., 4801 Henry St., sanitary sewers and treatment plant. $1,706,000. CD 11/13/46.

▲ **Mo., Cape Girardeau**—City, City Hall, $1,598,000 bond election Feb. 14, sewage disposal and treatment project, incl. 4 pumping stations, interceptor and outfall sewers and sewage treatment plant. $1,848,000. Williamson & Assocs., 6731 Manchester Ave., St. Louis 10, Mo., consult. engrs. CD 11/5/58.

▲ **Wis., Madison**—Madison Metropolitan Sewerage Dist., 104 N. 1st St., interceptor sewer, pumping station (3 yr. program). $9,000,000. Mead & Hunt, Inc., 2320 University Ave., consult. engr.

AIRPORTS

▲† **N. Y., Niagara Falls**—LAUNCHING SHELTERS—U. S. Eng., foot of Bridge St., Buffalo, 20 launching shelters B-type, BOMARC Missiles, Niagara Falls Municipal Airport. $1,800,000. Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York 17, N. Y. and Thos. H. McKaig, 881 Main St., Buffalo 3, N. Y., consult. engrs.

UNCLASSIFIED

▲ **Calif., Hollywood** — SITE PREPARATIONS — Century City, c/o Webb & Knapp, 383 Madison Ave., New York, N. Y., site preparations, incl. streets, grading, drainage, utilities. Daniel, Mann, Johnson & Mendenhall, 3325 Wilshire Blvd., Los Angeles 5, Calif., consult. engrs. CD 1/10/58, under Commercial Buildings.

▲ **Ohio**—GAS PIPE LINES—East Ohio Gas Co., E. 9th and Superior Ave., Cleveland, Zone 14, 30-plus mile gas pipe line from near Streetsboro north of Kirtland Twp., 24 and 26 in. lines to serve Mentor Twp. and Euclid, Portage, Geauga Lake and Cuyahoga Counties, $4,500,000. Constr. in Spring. CD 10/10/52.

PUBLIC BUILDINGS

▲ **Fla., St. Petersburg**—HOSPITAL ADDN.—City, City Hall, plans by Reynolds Smith & Hills, archts.-consult. engrs., 430 Morgan St., Tampa, Mound Park Hospital addn. $2,000,000. CD 11/25.

▲ **Ga., Atlanta**—SCHOOLS—Fulton Co. Bd. Educ., 165 Central Ave., S.W., bond election Jan. 26, schools, $3,300,000. CD 4/30/57.

▲ **Ill., Pontiac** — HIGH SCHOOL — Bd. Educ., Pontiac School Dist., plans by Perkins & Will, 309 W. Jackson St., Chicago, high school, $2,069,000.

▲ **Me., Gardiner**—HIGH SCHOOL—School Admin. Dist. No. 1, Gardiner, plans by Allied Engineers, Inc., archts.-engrs., 649 Forest Ave., Portland, high school, Old Gosline Lot. $1,600,000. Constr. 1961. CD 10/9/59.

▲ **Md., Baltimore** — SCHOOLS — City, Bureau Bldg. Constr., 410 Municipal Bldg., Zone 2 plans by Taylor & Fisher, 103 W. Hamilton St., Zone 1, Md., brick, steel frame, concrete, block Harlem Park Junior High School and Harlem Park Elementary School, two separate bldgs. connected by covered walkway, $4,000,000; plans by Fenton & Lichtig, 2219 Maryland Ave., Zone 18, 1, 2 and 3 story steel frame, brick, concrete Belmont Elementary School, Belmont Ave. and Ellamont St. $990,000.

▲ **Md., Towson**—SCHOOLS—Baltimore Co. Bd. Educ., Aigburth Rd., Zone 4,
Patapsco Neck Senior High School, $2,810,000.
Lansdowne Senior High School, $2,955,000, Constr. 1961.
Dulaney Senior High School, $2,800,000.
Perry Hall Junior High School, $2,500,000, Constr. 1961.
Deep Creek Junior High School, $2,600,000, Constr. 1961.
Bedford Elementary School, $885,000, Constr. 1961.
Deep Creek Elementary School, $1,005,000, Constr. 1961.
Padonia Elementary School, $885,000, Constr. 1961.
Pikesville Junior-Senior High School, $3,333,000.
Church Lane Elementary School, $940,000.
South Reiserstown Elementary School, $720,000.
Carney Elementary or Cromwell Elementary School, $940,000.

▲ **Mo., St. Louis**—SECURITY TREATMENT CENTER—St. Louis State Hospital, 6300 Arsenal St., Zone 39, 300-bed maximum security treatment center for criminally insane. $5,200,000. CD 2/1/56.

▲ **N. J., Ramsey**—SCHOOL—Bd. Educ. Ramsey Boro, defeated referendum Dec. 14, 22-room school, off North Central Ave. $1,571,400. CD 11/11.

▲ **N. Y., Amityville** — SCHOOL — Bd. Educ. plans by Knappe & Johnson, 2110 Northern Blvd., Manhasset Blvd., Manhasset, Junior High School. $3,500,000. Fraioli-Blum-Yesselman, 250 E. 43 St., New York 17, N. Y., structural engrs. Fred S. Bubin Assocs., 312 7 Ave., New York 1, N. Y., mechanical engrs. Bids probably in April. CD 7/5.

▲ **N. Y., New York**—SCHOOL—Bureau Constr. Bd. Educ., 42-15 Crescent St., Long Island City, plans by George J. Sole, 347 E. 52 St., Zone 22, Proj. E-477, P.S. 29, Courtlandt Ave. between E. 156 St. and E. 157 St., Bronx Boro., $2,800,000. Kaplun & Meyers, 31 Union Sq., Zone 3, mechanical engrs. Frank L. Ehasz, 40-29 27 St., Long Island City, Zone 1, consult. engr. Bids in January. CD 1/25.

▲ **Okla., Tulsa**—LIBRARY—City, City Hall and Tulsa Co., Courthouse defeated bonds Dec. 13, city-county library, $3,850,000. CD 11/22.

▲ **Pa., Hopewell**—SCHOOL—Pa. Public Sch. Bldg. Authority, 101 S. 25th. St., Harrisburg, school for Northern Bedford Jt. Sch. Dist., Hopewell, R.D. 1, Proj. D2-711, $1,500,000.

▲ **Pa., West Chester** — DORMITORIES — General State Authority, 18 and Herr Sts., Harrisburg, plans by Henry D. Dagit & Son, 1329 Rose St., Phila., 2 dormitories, West Chester State College. $3,586,000. CD 12/13.

▲ **Tex., Dallas**—SCHOOL—Dallas Ind. School Dist., 3700 Ross Ave., plans by Goodwin & Cavitt, Vaughn Bld., and Mark Lemmon, Thomas Bld., Grady Spruce High School, SE of Pleasant Grove on Old Seagoville Rd. east of St. Augustine Rd. $3,400,000. R. L. Rolfe, 2401 A Bryan St., Dallas, consult. engr. Bids March 1962. CD 5/13.

▲ **Wyo., Casper**—SCHOOLS—Natrona County School Dist. No. 2, voted $5,573,000 bonds, Dec. 6, high and elementary schools. CD 10/24.

COMMERCIAL BUILDINGS

▲ **Calif., Ventura**—SENIOR CITIZENS HOUSING—Oasis Development Co., 3421 West 8 St., Los Angeles, Calif., Senior Citizens Housing. $10,000,000. Bids June 1961.

▲ **Conn., New Milford**—HOUSES—Henry Perrault Realty Co., 3919 Main St., Bridgeport, 200 houses, Candlewood Trail. $2,000,000.

▲ **Fla., Fort Lauderdale** — APARTMENT — Coral Ridge Properties, 716 N.E. 6th Ave., plans by Charles F. McKirahan, 2400 E. Oakland Park Blvd., 15 story, 460,000 sq. ft. Coral Ridge Tower Co-op apartment, 330 suites, swimming pool, $6,000,000. D. E. Britt Assocs., 1626 N. Federal Highway, consult. engrs.

▲ **Fla., Fort Lauderdale** — SHOPPING CENTER — Coral Ridge Shopping Plaza, 1451 North Bayshore Dr., Miami, plans by Frank R. Mudano, First Federal Bldg., Clearwater, shopping plaza, US 1 and Oakland Park Blvd. $3,200,000. Southeastern Engineering, First Federal Bldg., Clearwater, consult. engr.

▲ **Ind., Indianapolis**—SHOPPING CENTER—Holiday Park Realty Corp., c/o Indiana Gun Club, 2416 E. 91st St., shopping center, northeast corner E. 38th St. and Post Rd. $2,000,000.

▲ **Ind., Indianapolis**—APARTMENTS—Owner, c/o Richard L. Fisher, 2416 E. 91st St., 182 unit apartments, southeast corner 42nd and Post Rd., $1,500,000.

▲ **Ind., Richmond** — SHOPPING CENTER — Owner, c/o A. Siegler & Sons, 5117 Lee Rd., Bedford, plans by Sidney H. Morris & Assocs., 134 W. LaSalle St., Chicago, Ill., shopping center, 30 acres tract, State Rte. 40. $2,500,000.

▲ **Iowa, Council Bluffs**—MOTEL—Riverside Motel, Inc., c/o Ted Seldin, 24 N. 6th St., Omaha, Neb., motel, area bounded by W. Broadway, 2nd Ave. and 35th and 36th Sts. $1,500,000. Bids in Summer.

▲ **Mo., Columbia** — HOME — National Benevolent Assn. Church of Christ, c/o St. Louis Christian Home, 3033 N. Euclid Ave., St. Louis, Zone 15, plans by P. John Hoener & Assocs., 4227 Watson Rd., St. Louis 9, Mo., Woodhaven Christian Home for Exceptional Children, nine units of six cottages each, chapel, school, administration and diagnosis bldg., Hy. 63 near Lenoir Home. $2,500,000. Bids for First Phase Spring or Summer 1961. CD 12/21/59.

▲ **N. J., Beachwood**—HOUSES—Robert E. Johnson, Mermaid Ave., plans by Samuel Paul, 89-51-164 St., Jamaica, N. Y. and Herman York, 9004 161 St., Jamaica, N. Y., 400 houses, off Rte. 9. $7,000,000.

▲ **N. J., Union**—BOWLING ALLEY—Daniel Williams, 13 Lorraine St., Glen Ridge, plans by James Centanni, 263 Clinton Ave., Newark, 40 lane bowling alley, Sayre Rd. $1,500,000.

▲ **N. Y., Forest Hills**—APARTMENT—Charles G. Meyer, 68 William St., New York, Zone 5, plans by Morris Rothstein & Sons, 186 Joralemon St., Brooklyn, Zone 2, 14 story, 267 unit Continental Apartments, east side Queens Blvd. and west side 108 St. between Seventieth Rd. and Seventieth Ave. Over $5,000,000.

▲ **N. Y., New York**—OFFICE, etc.—Howard Barnaby & S. G. Schimenti, c/o Depot Constr. Corp., 42-15 Crescent St., Long Island City, Zone 1, plans by Henry George Greene, 855 6 Ave., Zone 1, 20 story, 140,000 sq. ft. office and stores 814-822 2 Ave. Sec. 2 Ave. and 44 St. $3,200,000.

▲ **O., Cincinnati**—HOUSES—Hamilton Co., 1720 Section Rd., 152 one story, brick houses, paving, sewer-water lines for 152 lots, off Compton Rd. $2,800,000. Edward Niemeier, 4484 Harrison Ave., consult. engrs. Bids in Summer.

▲ **O., Lakewood**—OFFICE and COMMERCIAL—The Sloane Co., Rm. 209, 4275 Pearl Rd., Cleveland, Zone 9, plans by Irving Rothenberg, 1000 Wayside Rd., Cleveland, Zone 10, two 5 story air conditioned office and commercial bldgs., 160 car parking, Sloane and Keilworth Aves. $2,000,000. Fred W. Klotzman, 1990 Lander Rd., Cleveland, Zone 24, consult. engr.

▲ **O., Mt. Healthy (Br. Cincinnati)**—HOUSES—Murphy Homes, Inc. 7945 Hamilton Ave., six hundred 1 and 1½ story, bsmnt., brick houses, Kemper and Hamilton Aves., $9,600,000. Edward Niemeier, 4484 Harrison Ave., Cincinnati, consult. engrs. CD 4/21.

▲ **O., North Royalton**—SHOPPING CENTER—A & E Constr. Co., 18530 Fowles Rd., Berea, plans by Grosel & Jencen, The Arcade, Cleveland, Zone 14, 48 unit shopping center, State and Edgerton Rds. $2,000,000.

▲ **O., Youngstown**—TEMPLE—Bd. Trustees Masonic Temple, 233 Wick, temple, Midlothian Blvd. and Glenwood Ave, Boardman Twp. $2,500,000.

▲ **Tenn., Nashville**—SHOPPING CENTER—Metropolitan Land Corp., c/o Waterfield & Bass, 226 Capitol Blvd., Zone 3, South Plaza Shopping Center, Nolensville Rd., U. S. Rte. 21A, $2,500,000. Wm. C. Parrish Associates, West Melrose Bldg., 2535 Franklin Rd., Zone 4, consult. engrs.

▲ **Tenn., Oak Ridge**—SHOPPING CENTER—A & M Shopping Center, c/o A. P. Cappiello, Route 1, Concord, plans by David B. Liberman, 605 W. Walnut St., Knoxville, shopping center, Hy. 62, $2,000,000. Allen Jones, Cherokee Bldg., Knoxville, consult. engrs.

▲ **Tex., Amarillo**—OFFICE, etc.—Southwestern Bell Telephone Co., 308 S. Akard St., Dallas, 5 story, telephone div. office, and 1 story addn. to office, $1,000,000-$2,000,000. Constr. 1961.

▲ **Tex., Houston**—OFFICE, etc.—Houston Home Builders Assn., 2710 W. Alabama St., plans by Caudill, Rowlett & Scott, archts.-consult. engrs., 3400 Montrose Blvd., 10 story office tower, and 2 story exhibit hall, 4 acres, north of Richmond Ave. between Rosedale Rd. and W. Loop Freeway. $2,000,000. Bids mid-1961.

▲ **Wis., South Milwaukee**—BOWLING CENTER—Consolidated Bowling Corp., 525 E. Michigan St., Milwaukee, Zone 2, 60,000 sq. ft. bowling center. $1,500,000.

▲ **Ont., Toronto**—OFFICE—State Rock Investments Ltd., 75 Eglington Ave. E., plans by E. I. Richmond, 455 Spadina Ave., 11 story, rein.-con., brick, glass office, southeast corner Yonge St. and Davisville Ave. $1,500,000. A Shuper, 460 Manor Rd. E., consult. engr. CD 2/1.

INDUSTRIAL BUILDINGS

▲ **Calif., Fremont**—ASSEMBLY PLANT—General Motors Corp., Chevrolet Div., General Motors Bldg., Detroit, Mich., assembly plant. To go ahead 1961.

▲ **La., Baton Rouge**—PLANT ADDN.—W. R. Grace & Co., 7 Hanover Sq., New York 5, N. Y., polyethylene plant addn. $5,000,000.

▲ **Mass., Lynn**—POWER PLANT—New England Power Co., 441 Stuart St., Boston, power plant off Lynnway near Lynn Harbor. $40,000,000.

▲ **Pa., West Mifflin**—ANNEALING LINE—United States Steel Co., 525 Wm. Penn. Pl., Pittsburgh, continuous annealing line for heat treating thin rolled steel, Irwin Works. $8,000,000.

▲ **Alta., Whitecourt**—MILL—Alberta West Forest Products Corp. Ltd., 139-10021 100th St., Edmonton, pulp and paper mill. $38,000,000. Bids in Spring.

PUERTO RICO

▲ **Puerto Rico, Rio Piedras** — ADMINISTRATION & HOSPITAL—Puerto Rico Dpt. Health, P.O. Box 9342, Santurce, plans by Isadore & Zachary Rosenfield, 45 West 45 St., New York, N. Y., U.S.A., administration and hospital. $8,000,000. Bids April 1961.

FOREIGN

▲ **Burma, Rangoon**—PARLIAMENT BUILDING—National Housing and Town & Country Development Bd., Bogyoke Aung San St., Rangoon, parliament building to house Ministeries of Defense, Foreign Affairs and Intonation. $8,400,000.

▲ **Burma, Syria**—OIL REFINERY EXPANSION—Govt. Burma and Burma Oil Co. (joint venture) c/o Burma Oil Co. Ltd., 604 Merchant St., Rangoon, oil refinery expansion and pipe line carrying refined products across Rangoon River. $2,500,000.

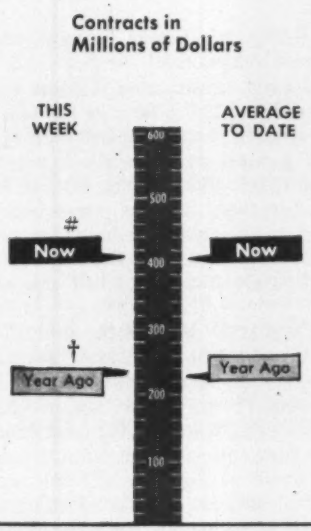
▲ **England, Bradford**—HOSPITAL—Leeds Regional Hospital Bd., Harrogate, Bradford, hospital. $9,870,000.

▲ **Ireland, Haulbowline** — STEEL PLANT, etc. — Irish Steel Holdings Ltd., Haulbowline, County Cork, steel plant, incl. oil fired furnace, blooming mill, large section mill and rolling gear and wire rod mill. $9,500,000.

(Proposal Advertisements see pp. 69 to 71)

Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

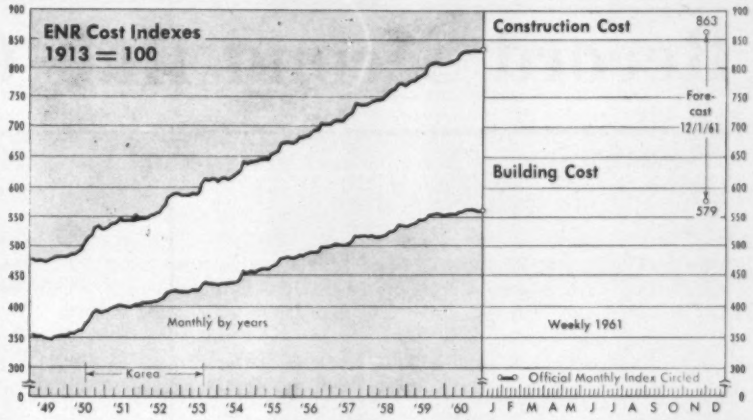
Contracts Awarded In 50 States By Type	This Week‡ millions	Cum. 52 wks 1961 millions	Chge '60-'61 %
All Heavy Construction	$407.7	$407.7	+76
By Ownership			
PRIVATE	121.4	121.4	+20
PUBLIC	286.3	286.3	+120
State & Municipal	220.3	220.3	+148
Federal	66.0	66.0	+60
By Type of Work			
PUBLIC			
Waterworks	4.2	4.2	−44
Sewerage	8.8	8.8	−30
Bridges*	13.8	13.8	+64
Highways	127.6	127.6	+328
Earthwork, Dams & Waterways	14.1	14.1	−29
Buildings:			
Excl. Housing	94.4	94.4	+422
Housing	6.1	6.1	−32
Unclassified	17.3	17.3	−31
PRIVATE			
Buildings:			
Mass Housing	58.8	58.8	+69
Commercial	29.7	29.7	+95
Industrial	20.8	20.8	−55
Unclassified	12.1	12.1	+152

† 4-days ‡ 3-days
*Includes Private bridges
NOTE Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Dec. 29, 1960 millions	Cum. 52 wks '59-'60 millions	Chge '59-'60 %
Corporate Securities	$10.2	$ 3,698.2	−11
State and Municipal:			
All Except Housing	118.6	6,394.2*	+ 9
Housing	18.4	241.9	+102
Federal Loans	1.1	178.5	+27
Federal Aid		3,228.4	− 3
Total Nonfederal	$148.3	$13,741.2	+ 1
Federal Appropriations:			
Projects in U. S.		$ 3,165.6	−11
Outside U. S.		159.1	+610
Total New Capital	$148.3	$17,065.9	− 1

* Previous week raised to $167.1 million instead of $250.2 million.



ENR INDEXES (1913 = 100), 20-cities' average	Week of Dec. 29 1960	% Change from Dec. 1 1960	% Change from Dec. 31 1959
Construction Cost	834.32*	+0.4	+2.8
Building Cost	562.91*	+0.3	+1.5

*Official Monthly Index for January, 1961.

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

This Month . . .

WAGE RATES, 20-cities' average	Jan. 1961	% Change from Dec. 1960	% Change from Jan. 1960
Common	$2.765	+0.7	+4.8
Skilled (average 3 trades)	4.118	+0.5	+4.3
Bricklayers	4.336	+0.6	+3.9
Structural Ironworkers	4.164	+0.5	+4.6
Carpenters	3.855	+0.4	+4.5
Equipment operators (average three types)	3.736	+0.2	+4.9
MATERIAL PRICES, 20-cities' average			
Structural Steel (average 3 mills), per cwt	5.50	0	0
Lumber, 2x4 Fir, per M fbm	115.68	+0.1	−4.9
Lumber, 2x4 Pine, per M fbm	108.62	−0.1	−0.3
Cement, bulk, per bbl	4.04	+0.2	+1.2
Sand, per ton	2.362	0	−4.3
Ready-mixed concrete, per cu yd	14.27	+0.07	−0.1
Gypsum sheathing, ½″x2′x8′, per Msf*	62.47	0	−1.3
Fiber board sheathing, ½″ sq. ed., per Msf*	70.66	0	−3.9
Mineral wool insulation, 3′ batts, per Msf*	68.12	0	−0.4
Crushed stone, 1½″, per ton, CL	2.702	+2.0	+0.07
Concrete blocks, sand/gravel, 8″x8″x16″, each*	0.2292	+0.3	−1.8

Latest Month . . .

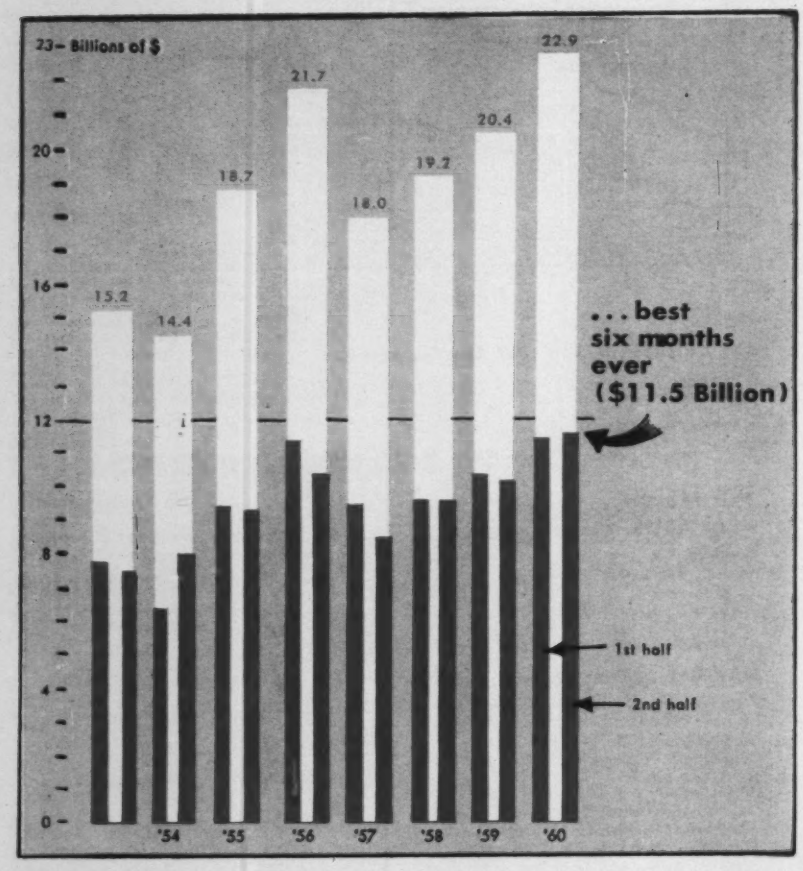
	Dec. 1960	Nov. 1960	Dec. 1959
Brick, common per M	41.04	+0.2	+3.6
Lime, hydrated finishing, per ton, CL	38.88	0	−1.1
Structural clay tile, 3x12x12″, per M, 2,000 up	188.91	0	+2.2
Vitrified clay sewer pipe, std 12″, per ft	1.403	0	−5.1
Concrete sewer pipe, 12″, per ft	1.419	0	+5.2

*Delivered, trucklots

ENR INDEX REVIEW

1959	Construction Cost 1913=100	Construction Cost 1949=100	Building Cost 1913=100	Building Cost 1949=100	Volume 1913=100	Volume 1949=100
1959 Average	**796.91**	**167.06**	**547.82**	**155.72**	**540**	**156**
1960						
Jan.	811.84	170.19	554.40	157.59	432	125
Feb.	812.73	170.37	555.43	157.89	486	140
Mar.	813.26	170.48	555.16	157.81	533	154
Apr.	814.78	170.80	556.98	158.04	695	201
May	822.58	172.44	559.57	159.06	610	176
June	826.64	173.29	561.02	159.48	784	227
July	829.33	173.85	562.63	159.93	682	197
Aug.	830.18	174.03	562.17	159.80	631	182
Sept.	830.92	174.19	562.79	159.98	603	174
Oct.	829.58	173.90	561.45	159.60	591	171
Nov.	830.09	174.01	561.11	159.50	609	176
Dec.	830.61	174.12	561.50	159.61	503	145
1960 Average	**823.55**	**172.64**	**559.43**	**159.02**	**597**	**172**
1961						
Jan.	834.32	174.90	562.91	160.01	...	...

Record Second Half Caps a Record



Recession? Could be, but not in heavy construction.

Heavy construction volume set a record of $22.9 billion in the year just ended. In the second half of the year, while some industrialists, economists, politicians and business writers broke into a slight nervous sweat over the downward trend of most economic indices, heavy construction roared blithely to the biggest half year ever—a volume of $11.5 billion in awards.

Next year? More of the same. There is no sign that the heavy construction boom is losing momentum. The huge volume of new plans that backed up 1960's record contracting total promises to grow into an even heavier volume of contracts this year. (Details on the 1961 outlook will be presented in ENR's annual Review and Forecast Issue, scheduled for January 26.)

The big second half push brought 1960 volume above ENR's midyear "minimum" forecast of $22.7 billion (ENR July 14, 1960, p. 21). It topped 1959's total (for 50 states) by 12%.

Main reason the July-December period wound up 2% higher than the first half was a 12% gain in state and local public works. This more than offset a 10% drop in Federal awards and a 3% decline in private heavy construction during that period.

Public buildings, sewerage and highways led the state and local category in the second half—all scoring impres-

Engineering Construction Contracts for December

Five Weeks—Thousands of Dollars (000 Omitted)

	December, 1960								Annual Total U. S. (50 states)			Canada
	New England	Middle Atlantic	South	Mid-West	Mississippi to Rockies	Far West*	Total U. S.	% Change '59 to '60	1960 (52 wks)	1959 (53 wks)	% Change '59 to '60	Dec. 1960
Public Works, Total	38,488	205,153	165,257	184,733	266,984	226,160	1,096,775	+51	10,807,418	10,001,312	+ 8	62,537
Waterworks	948	1,872	5,887	5,535	5,070	11,183	30,495	+76	454,609	375,782	+21	2,684
Sewerage	396	29,510	9,954	10,923	9,709	14,054	74,546	+59	619,458	655,196	– 5	2,997
Bridges	1,034	8,917	8,267	11,446	8,235	16,137	54,036	+42	785,785	557,987	+41	7,040
Earthwork, waterways	128	15,633	14,358	1,959	32,296	12,183	76,557	–13	779,854	914,817	–15	4,693
Streets and roads	6,780	50,843	51,344	67,412	62,584	58,880	297,852	+58	3,400,839	2,808,891	+17	11,182
Buildings: Residential	3,601	7,360	5,379	33,764	29,460	16,344	95,908	+511	735,487	590,612	+25	2,012
Other	21,417	81,621	53,988	38,403	49,671	49,732	294,832	+58	2,564,418	2,603,944	– 2	24,086
Unclassified	4,175	9,397	16,080	15,291	69,959	57,647	172,549	+17	1,466,968	1,404,083	+ 4	7,843
State and Municipal	29,851	164,448	119,709	171,548	146,898	168,953	801,407	+61	8,350,139	7,169,633	+16	60,554
Federal	8,637	40,705	45,548	13,185	120,086	67,207	295,368	+28	2,457,279	2,831,679	–13	1,983
Private, Total	87,187	168,786	114,702	88,223	216,770	132,944	778,612	–11	12,096,614	10,421,196	+16	56,278
Bridges	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	8,695	12,353	–30	. . .
Buildings: Industrial	7,657	18,812	49,543	27,097	62,792	51,580	217,481	– 1	2,792,102	2,993,318	– 7	14,502
Mass housing	27,985	106,654	27,530	23,727	79,464	64,702	330,062	–16	5,762,186	4,700,683	+23	14,606
Commercial	20,990	42,495	32,341	36,770	57,173	16,184	205,953	+22	2,539,062	2,160,632	+18	27,020
Unclassified	555	825	5,288	629	17,341	478	25,611	–72	994,609	554,210	+79	150
Total, Dec., 1960—5 wks*	95,675	373,939	279,959	272,956	483,754	369,104	1,875,387	+17	. . .	. . .	. . .	118,815
Total, Nov., 1960—4 wks*	97,833	549,447	241,432	228,345	328,827	329,025	1,774,909	. . .	. . .	. . .	. . .	94,619
Total, Dec., 1959—5 wks*	69,665	346,518	306,962	171,062	411,108	295,277	1,600,592	. . .	. . .	. . .	. . .	120,853
Twelve Mos.,—1960 (52 wks)*	1,383,388	5,374,973	3,480,547	3,422,212	5,068,426	4,174,486	. . .	. . .	22,904,032	. . .	+12	1,897,448
Twelve Mos.,—1959 (53 wks)*	1,270,440	4,381,873	3,592,652	3,506,548	4,244,807	3,426,188	. . .	. . .	. . .	20,422,508	. . .	1,479,358
% Change '59 to '60	+9	+23	–3	–2	+19	+22	. . .	. . .	. . .	. . .	. . .	+28

* Includes Alaska & Hawaii contracts

Year

sive increases over first half awards. Sewerage was up 13%; public housing leapt 43%; and highway volume increased 11%. Those gains took the curse off drops of 8% in waterworks, 18% in earthwork-dams-waterway and 2% in bridges. But if these last three areas declined slightly in the second half, two of them nevertheless turned in record performances for the year as a whole. Waterworks finished 21% above '59 and bridges were up 39% (an increase attributable to the first-half Narrows Bridge contracts).

Other records: Commercial building, up 18% over '59; private unclassified, up 79%. The latter reflects the unprecedented boom in gas pipeline awards, which was forecast by ENR last Spring (ENR Apr. 21, 1960, p. 21).

Contractors had reason to cheer over the state of the highway and bridge market in 1960. For one thing, volume was second only to the peak year of 1958; but perhaps more important was the market's steadiness. In contrast with the booming first half and plunging second half that marked 1959, awards in '60 were fairly evenly distributed through the full year. The solid volume figures, particularly in the second half, can be attributed to an increase in federal aid for fiscal '61 (which began last July) and the distribution of quarterly obligation schedules three months in advance so that states could put the federal money to work promptly.

In the private heavy construction market, commercial building was the second half standout. Awards shot 18% ahead of the first half and topped the second half of 1959 by 32%. (Indications now are that the long '59 steel strike cost the construction industry about $100 million worth of new commercial building, although some of that probably dribbled over into '60 volume.)

The second half boom was not without weak spots, however.

Major disappointment: industrial building. Although industrial building picked up 16% in the second six months from an unusually bad first half, it never did live up to the promise of plans on the drawing board. A big spurt in plans took place in the first five months of '60—a spurt that, had general business conditions been better, should have brought forth a lot more industrial building than ENR recorded in the second half.

Another, but more predictable, laggard was private mass housing.

Mass housing (developments or apartments costing $400,000 or more each) sagged 18% in the second half after setting a record in the first six months. For the full year, however, mass housing's volume was second only to that of 1955.

December heavy construction volume rolled up an impressive total (see table p. 64) though seasonally lower than November. Volume soared 17% above a year ago to the third highest on record for December. Public works shot 51% higher than December '59, with sharp gains in nearly all major types of work; but a weaker industrial market pulled private work down 11%.

Here's how contractors made out by region last year:

New business soared 23% over 1959 in the Middle Atlantic states, 22% in the Far West, and 19% in the Mississippi-to-Rockies region (see table).

New England scored a healthy 9% gain.

However, awards dipped 2% to 3% in the Midwest and the South.

Three of the six U. S. regions set records for total contract volume in 1960. They were New England, Mississippi-to-Rockies, and the Far West. The South had its second best year, as did the Middle Atlantic area.

The Midwest fell a little short of its 1958 and 1959 totals and was well under its 1955-57 totals as it skidded to the lowest annual volume since 1954. However, the Middle West is one of the three regions of the U. S. where annual volume in 1960 was more than three times the total reported 10 years earlier. The Far West and New England in 1960 had 3.5 times their 1950 volume; while the Midwest had 3.3 times its 1950 volume. The Middle Atlantic and South had 2.6 times as much dollar volume in '60 as in 1950. The Mississippi-to-Rockies had 2.4 times its 1950 total. For the U. S. as a whole, last year's heavy construction volume was 2.8 times 1950's total and it was 5% greater than 1956's record.

While "heavy" awards set a record total new construction put in place dipped in 1960 for the first time in 16 years. Census Bureau statisticians estimate outlays at $55 billion, 2% under 1959's record estimate of $56.2 billion.

Most of this decline was due to less nonfarm housing—down $2.4 billion or 10%. This was less steep, however, than the slide in nonfarm housing starts, also estimated by Census.

Increases of 36% in industrial building, 3% in commercial and 5% in public utilities offset much of the slack in housing and held the over-all decline in private construction outlays to only 2%.

Public works spending dipped only 1%, thanks to gains of 1% in sewer and water system construction, 5% in nonresidential building (including schools), and 12% in river and harbor development, flood control and other utilities. They offset declines of 4% in highways, 11% in military construction and 26% in public housing.

These estimates reflect past history of contract awards. Both the 1959 drop in highway awards and 1959's climb in industrial awards were reversed in 1960, but put-in-place figures don't show this yet.

Costs Hit High Mark This Month

The first stage of the 1961 round of deferred wage increases under long-term labor contracts pushes building and construction costs to all time highs (for the wage outlook, see p. 66).

ENR's 20-Cities Construction Cost Index climbs to a record 834.32 (1913 = 100) in January as New York City common laborers get deferred wage hikes of 10.8 cents an hour (including fringes) and Seattle laborers a 15-cent-an-hour raise. Laborers on heavy construction projects get a 13-cent hourly deferred increase in Minneapolis and a five-cent-an-hour boost in New Orleans.

The 20-Cities Building Cost Index hits an all-time peak of 562.91 (1913 = 100) this month, reflecting five-cent-an-hour deferred wage hikes for bricklayers in Dallas and carpenters in Denver; deferred wage and fringe boosts in New York combine in a whopping 39.2-cent-an-hour raise for structural ironworkers, 21 cents an hour for bricklayers and 10.8 cents an hour for carpenters. In addition, carpenters in Seattle got a 15-cent-an-hour deferred wage hike on January 1 and bricklayers in St. Louis got a 21-cent hourly increase under a new contract.

By contrast, materials prices mark time as the New Year begins. ENR's U. S. average of Douglas fir 2x4 prices is 0.1% higher than a month ago. But southern pine prices average 0.1% lower than last month. Bulk cement prices rise five to six cents per bbl. this week in three of the 20 cities covered by the ENR Cost Indexes.

No Leveling in Sight for '61 Labor

- **Collective bargaining in 1960 added another 14.8 cents an hour to union wage scales. This year—more of the same.**
- **High construction volume and the growing trend to long-term contracts means it will be difficult to hold the line this year or next.**
- **Contractors, worried about pricing themselves out of the market, hope to get bigger cuts in indirect labor costs.**

The construction industry added another 14.8 cents an hour to its union wage scales last year and set the stage for further hourly increases of 15 cents or thereabouts in 1961 and 1962. The figures which do not include fringe benefit costs, are about a cent higher than they were in 1959.

That is the story told by collective bargaining reports received and recorded by ENR in 1960.

The reports give no indication of a leveling off of wages. Contractors, on the whole, have little hope of halting the upward climb. They are worried and disturbed.

"I think we are in for continued increases," observes one contractor. Another comments: "Annual wage boosts are now an accepted practice. They are larger than the economic facts dictate. It's a source of major concern to the industry."

The principal factors feeding the upward climb of wages promise to continue for some time to come. They are high construction volume and a marked increase in the use of long-term labor contracts.

The latter provide the automatic, deferred pay boosts, which serve as stepstones to higher wage levels. Some contractors feel that even if the line could be held on basic wages, the pent-up pressure would merely produce more and higher fringes with no net saving to the industry. Such a situation occurred last year in half of the 10 reported wage freezes.

Paradoxically, the 1960 increases were won at a time when contractors were complaining of keener competition and lower profit margins.

Contractors in some areas see a real possibility of pricing themselves—at least to some extent—out of the market.

A major contractor in Denver expressed a prevalent fear when he referred to a 1960 contract that spreads a 52½-cent wage increase over a two-year period. "This means another big round of demands for increases next Spring when contracts with other trades are open. This is going to price Denver out of some buildings. Already, some development and promotional projects have been scrapped because of high building costs, and if another wage increase has to be given all around next Spring, more jobs that are on the boards will be dumped."

Unions are inclined to take such cries of alarm with a grain of salt. And they are more impressed by the volume of construction activity than by contractor cries of poverty. "Our research indicates no increase in the number of contractors going bankrupt," observes one union official. "I mean firms and individuals in the trade for a period of time, not those just arrived with the idea of its being a game for quick and easy profits."

One contractor spokesman suggests that employers will have an even tougher time at the bargaining table this year. He thinks that any efforts of the Kennedy Administration to prime the economic pump through new construction outlays will provoke higher union demands and make it more difficult—if not impossible—for contractors to obtain cheaper labor contract settlements in 1961. Experience has shown that contractor defenses are weak in areas or periods of full employment.

The squeeze on profits, however, has already produced two developments that may become more significant:

• Some disenchantment in the ranks of contractors is showing up with respect to long-term labor pacts, which are putting an increasingly higher price tag on the stability they seek to achieve. In one sense, such contracts put contractors in the position of "robbing Peter to pay Paul." Their use, however, appears to be firmly imbedded in the industry and any quick reversal of the trend is unlikely.

• Contractors are pushing harder for cost-cutting concessions to help offset the inevitably higher wage costs. As one Association spokesman puts it: "Our only hope for meeting the increased demands of labor is through greater productivity." Long-term contracts that freeze the status quo of working conditions have given this search a sense of urgency. And out of it all are coming sharper clashes over management demands that cut labor costs by whittling down the job opportunities of union members.

A look at what is happening in long-term contracts gives some indication of the industry's dilemma.

In 1960, 68% of all the settlements reported to ENR were for terms of more than one year—up from 54% in 1958. They ranged from two to five years in duration. Two-year contracts were still the most popular, but the biggest jump occurred in three-year contracts (see table). Roofers and iron workers were the two trades showing the strongest preference for one-year contracts.

Annual increases under both short- and long-term contracts ranged from 2.5 to 40 cents an hour, with 15 cents occurring with the greatest frequency. Three-year contracts with package increases of 75 cents were not uncommon. One such agreement will push the scale of New York City asbestos workers to $5.25 on July 1, 1962.

Increases expressed in percentages of base pay instead of flat sums per hour were reported in six instances only. Wage reopeners and cost-of-living escalator clauses all but disappeared.

The one-year contracts proved the cheapest. Their 1960 increases averaged 14.2 cents. In long-term contracts, the average of the 1960 increases was 14.9 cents an hour, with average deferred increases of 14.4 cents slated for this year, and of 15 cents for 1962.

The over-all cost of the contracts

Costs

was cheapened in many cases by the payment of annual increases in installments. The effect is to decelerate the cost of a contract.

About 81% of the long-term contracts resorted to this device. Although they followed no discernible pattern, 15-cent increases were often paid, or scheduled for payment, in installments of 10 and five cents, and 20-cent increases in installments of 10 and 10 cents. Even with this refinement, the hard fact remains that the full costs of the contracts are telescoped into periods that are shorter than the contracts themselves.

Union wage scales in construction have moved up to an average of $3.66 an hour, as the result of 1960 wage increases. That is the latest estimate of the U. S. Department of Labor.

The figure may be high because it is based on seven trades only—and those in 100 cities. Random reports to ENR put the average closer to $3.55.

A collateral development has been a general increase in fringe benefit costs. But here, the activity has been more spotty and less uniform.

The vast majority of the 1960 contracts provided for the payment of fringe benefits in flat sums per hour, as opposed to the more costly method of a percentage of base pay. Union members have the option under a number of contracts of taking a negotiated increase as a wage boost or fringe benefit, either in whole or in part.

Health and welfare payments remained the most popular benefits—they were mentioned in 23% of the settlements reported last year. There was a noticeable increase in the negotiation of pension and vacation funds. One development in northern California was the adoption by two trades of a plan that gives workers two weeks' vacation pay that can be taken either as vacation pay, or as double pay if they choose to work without taking a vacation.

Apprentice training funds were established with greater frequency, apparently under the stimulus of the Landrum-Griffin law, which removed all doubts about the legality of such contributions. There was also a slight increase in the negotiation of industry promotion funds.

Interest in pension plans is expected to increase. One contractor observes: "Construction used to be a young man's game. When a man grew older, he would turn to some other line of work. Now, with the increased use of machinery, they are staying on the job well into their fifties and sixties, and that means we'll need bigger and better pension plans."

Meanwhile, some doubt has been expressed about current interest in vacation plans. One employer says they are "superfluous." Construction workers already get a lot of time off because of seasonal conditions, he reasons, and are paid higher wages to compensate for this. But he concedes that universal summer vacations will become the pattern in his area and warns: "We'll have to get together with the unions and stagger those vacations before it becomes a big problem."

Little appears to have been accomplished in the direction of consolidating fringe benefit plans to cut administrative costs. Among the exceptions is a new health and welfare plan in Omaha which covers eight unions.

Strike activity remained about the same as in 1959, despite the growing uneasiness of contractors. The stumbling blocks were varied. Conflicts over hiring hall provisions created many of the deadlocks.

Last year, 16.7% of all contract settlements reported to ENR were concluded after strikes that lasted from one day to six months. The corresponding figures for 1959 and 1958 were 17% and 28%, respectively. This downturn conformed to the national pattern.

The first nine months of 1960 had fewer strikes and involved fewer workers than any similar period since the end of World War II, according to the U. S. Department of Labor.

Perhaps one of the reasons for fewer strikes was an apparent willingness on the part of unions to make some concessions to compensate, at least in part, for the higher wage costs. Here, contractors made some progress—but it was not very dramatic.

A Pennsylvania contractor, for example, reports that some union concessions were obtained on prefabrication and on labor-saving devices. A Florida union agreed to man public works jobs at wage levels in effect on the bid date, regardless of subsequent wage boosts. Employers in one California city claim progress on elimination of non-working stewards and on greater freedom in the selection of foremen, but they report no headway on crew sizes.

In New York City, progress was made

The '60 Wage Picture

1. Base pay increases higher; long-term contracts costlier.

Length of contract	Average Increases in 1960	1959	1958
One-year contract	14.2¢	13.7¢	15.5¢
Long-term contract			
First year	14.9¢	13.8¢	14.5¢
Second year	14.4¢	13.4¢	13.7¢
Third year	15.0¢	13.4¢	12.6¢

2. Interest in long-term contracts increases.

In 1960, 68% of contracts were long-term.
In 1959, 65% of contracts were long-term.
In 1958, 54% of contracts were long-term.

3. Most popular increase—15¢.

Amount of increase	% of all contracts 1960	1959
15¢	32%	27%
10¢	19%	25%
20¢	11%	8%
12½¢	7%	8%
25¢	4%	5%
All others	27%	27%

. . . Fringe benefits follow wages on the upward path

with some trades in the payment of wages by check instead of in cash, and in computing fringe benefits, where based on percentages, on straight time only. Elsewhere, a few trades agreed to cut overtime from double-time to time-and-a-half for certain types of evening or weekend work. Chicago plumbers banned the coffee break to assure contractors a full day's work.

Unions in some areas eased their demands on travel pay but no noticeable trend or pattern emerged. The feeling has been expressed in one area that unions have come to view travel pay as a source of extra money, not as reimbursement for expenses. "Men living in cities 50 miles apart now frequently pass each other on their way to work in each others' cities," it is reported.

Contractors in one eastern city feel that they have not won on any cost-cutting issues. New Jersey contractors say they have made some headway in knocking out show-up time and their efforts have produced a lessening of jurisdictional disputes and, to a degree, of featherbedding practices. "But we have not accomplished enough to compensate for the extra wage costs," notes one of their spokesmen, who sees a great need for a more realistic approach to the industry's labor cost problems.

The work practices code, commonly called the "Ten Commandments," has helped a little, according to some contractors. But it appears to have played a minor role in 1960 bargaining. One of the trades in East St. Louis has made violation of the code a breach of its labor contract, but elsewhere the code has usually been formalized, if at all, only in a piecemeal fashion.

Although some areas report no union resistance to "safe" labor-saving devices and have labor contract clauses permitting them, others claim unions are more cooperative in spirit than in deed.

An eastern contractor spokesman, for example, notes that "when it comes to automation and mechanization, which means a loss of jobs for workers, the issue is not easy to deal with." One of the issues is an 18-week strike of elevator constructors in New York City, for instance, was the right of management to engage in off-site fabrication and assembly—and the problem was postponed rather than solved.

Expressing a sobering thought, one construction spokesman on the West Coast thinks the industry may eventually be paying workers for the right to use devices that throw them out of jobs. He points to a new waterfront labor agreement under which shipowners have purchased from dockworkers the right to mechanize. He says variations of the agreement may appear in the construction industry.

Under the contract, the union accepts mechanization, and management accepts the responsibility for the job loss to workers. The contract is estimated to cost employers $5 million a year.

"You don't buy automation cheap," the West Coast spokesman asserts. "And what are we doing about it? I'll tell you. We're worrying about it."

That is what contractors are generally doing about last year's collective bargaining developments and about the unsolved problems that lie ahead. Many who are worried have expressed the need for bargaining without work stoppages—but no one has offered a solution. Some talk inconclusively about master bargaining, others about wider area-bargaining.

Commenting on the past, a spokesman for one contractor association said: "We've been completely on the defensive, as usual. One black eye, instead of two, must always be considered a victory. We can improve our position by enlarging and tightening our membership, so as to eliminate factionalism—between ourselves and the homebuilders, and between those of us engaged in different crafts. We've been a split defense against labor's solid front."

"There is considerable talk among contractors for more planning," a Minnesota contractor reported, "But nothing definite has evolved."

Meanwhile, union leaders in one eastern city have this to say: There will be no let-up in union demands for higher wages and fringe benefits for their members. Unions in other fields are not pegging their demands at a certain level and industry is not pegging its prices at any level. Construction unions should not be asked to stand still.

Labor in Brief . . .

• Moonlighting protested—The AFL-CIO building and construction trades unions in Dallas have asked for a city ordinance to stop off-duty policemen and firemen from holding other jobs. Such an ordinance, they said, would "spread employment."

• Tighter labor laws wanted—New state legislation banning featherbedding and secondary boycotts has been urged in New York by the Empire State Chamber of Commerce.

• Situs picketing—The AFL-CIO has put legalization of situs picketing on its list of measures for prompt attention by the new Congress. In the federation's New Year's statement, President George Meany said, "Nearly everyone favors it, but it has been repeatedly shunted aside."

• Strike for maintenance—A building trades strike has upset the completion date of the $22-million Civic Arena in Pittsburgh and has forced city officials to cancel plans for a gala opening in June. The unions struck December 1 for some assurance their members would get the maintenance work when the arena is completed.

• Suit for damages—A California masonry firm has accused a local of the bricklayers union of preventing use of a labor-saving device known as a "speedlead." It has filed a suit against the union for $546,910 in damages.

• Merger completed—The AFL and CIO labor groups in Philadelphia have merged into the Philadelphia Council of the AFL-CIO.

• Oppose union goals—The Associated General Contractors of Wyoming, at its annual convention last month, opposed any extension of the Davis-Bacon Act, supported right-to-work legislation, and opposed the situs picketing bill and any liberalization of the state workmen's compensation law.

• R-W law upheld—Tennessee's right-to-work law, prohibiting the union shop and other forms of union security contracts, has been upheld by the state supreme court.

• A new assistant—Lane Kirkland, research and education director for the International Union of Operating Engineers, has been appointed executive assistant to AFL-CIO President George Meany.

Fraud Suit Needs Careful Plea

In damage suits involving fraud, the elements of fraud must be clearly alleged.

The common elements of fraud essential to a successful suit are summarized in the following Delaware case.

A subcontractor sued the prime contractor to recover damages he suffered by having been induced to enter into the subcontract by false representations made by the prime contractor.

The attorney for the prime contractor asked the court to dismiss the complaint on the ground that it did not set forth sufficient facts to support an action for fraud. The court denied the application. Although it found that the complaint was vague as to the necessary facts to sustain the action, it said the subcontractor should be given an opportunity to correct this defect and should be allowed to serve an amended complaint.

The court[1] stated: "Is the element of fraud pleaded with sufficient particularity to satisfy the requirements of Rule 9 (b) of the Delaware Superior Court Rules? To begin with, in every action of fraud there must be a deceiver and his victim. (1) The deceiver must make a false representation of a material fact to the victim. (2) The deceiver must have had knowledge of the falsity of his representation, while his victim must have been ignorant thereof. (3) The representation must have been made with the threefold intent that the victim believe it to be true, act in reliance thereon, and be deceived thereby. (4) The victim must have so believed, acted, and been deceived, as well as having been damaged thereby. See Traylor Engineering & Mfg. Co. v. National Container Corp., 6 Terry 143, 152, 45 Del. 143, 70 A. 2d 9, and Strasburger v. Mars, Inc., 7 Terry 274, 280, 46, Del. 274, 83 A. 2d 101. While the above definition will be valid as a general rule, it may be subject to modification, such as where the deceiver does not have actual knowledge of the falsity of his representation, but, rather, recklessly makes the representation without heed for its validity, or makes it under circumstances not justifying belief in its truth. See Nye Odorless Incinerator Corp. v. Felton, 5 W. W. Harr. 236, 253, 35 Del. 236, 162 A. 504; Words and Phrases, 'Fraud', Knowledge of falsity of misrepresentation, p. 78 et seq."

(1) Twin Coach Company v. Chance Vought Aircraft, Inc., 163 A. 2d 278, Superior Court of Delaware, May 31, 1960.

Right to Arbitrate Is Upheld

A Pennsylvania court has held that the right to arbitrate a dispute under a subcontract survives the cancellation of the subcontract.

In that case, the Wingate Construction Company entered into a contract with the United States for the construction of a swimming pool at the Maguire Air Force Base in Wrightstown, New Jersey. It subcontracted the electrical work to Jack Aloff Company. The subcontract contained a provision for the arbitration of any dispute arising between the general and subcontractor.

In the course of the performance of the subcontract, certain disputes arose between the parties. Each party appointed an arbitrator and the court appointed the third arbitrator. However, previous to the selection of the arbitrators, the general contractor, as authorized by the provisions of the subcontract, discharged the subcontractor. The parties, however, proceeded with the arbitration. The award and decision of the arbitrators was approved by the court, whereupon the subcontractor brought an action to vacate, modify and correct the award of the arbitrators, which the court refused to do. The refusal was affirmed.[1]

The subcontractor contended that since his contract was cancelled, it was not bound by the award of the arbitrators. The court held that the discharge of the subcontractor did not terminate the contract in so far as the arbitration of disputes.

(1) Aster v. Jack Aloff Company, 155 A. 2d 627, Superior Court of Pennsylvania, Nov. 11, 1959.

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers;* and *Legal Cases for Contractors, Architects and Engineers.*

OFFICIAL PROPOSALS

Bids: January 16, 1961

Indus Basin Project

WEST PAKISTAN WATER AND POWER DEVELOPMENT AUTHORITY
ADVANCE NOTICE
OF
INTENT TO INVITE TENDERS
FOR THE
CONSTRUCTION OF CANALS AND APPURTENANT WORKS

The above Authority plans to undertake the construction of a number of large canals in West Pakistan. Their construction will be financed through the Indus Basin Development Fund, the operation of which will be administered by the International Bank for Reconstruction and Development (World Bank). The canals, which form a part of the Works embodied in the Indus Basin Settlement Plan will have a total length of about 390 miles and involve approximately 345 million cubic yards of excavation, as well as the construction of several hundred bridges and other canal structures.

The work will be divided into seven or more individual projects the first of which to be undertaken will be the Trimmu-Sidhnai Link Canal. This canal will extend from Trimmu on the Chenab River to near Sidhnai on the Ravi River and have a total length of 44 miles. It will have a capacity of 11,000 cubic feet per second and involve 20 million cubic yards of excavation, the construction of several regulators, bridges, aqueducts and other structures. The second project will be the Sidhnai-Mailsi-Bahawal Link Canal. This canal will extend from a point near Sidhnai on the Ravi River to the Sutlej River near the town of Mailsi, and from that river on to the Bahawal Canal. It will have a capacity at head of 10,100 cubic feet per second which capacity is reduced at intervals along its length to 3,900 cubic feet per second at its terminus. The total length of the link is 69 miles, and its construction will involve about 30 million cubic yards of excavation, several regulators, bridges, aqueducts, siphons and other structures.

The Authority plans to call for tenders for the construction of all or a portion of the Trimmu-Sidhnai Link early in 1961, and for the construction of the Sidhnai-Mailsi-Bahawal Link about midyear 1961. Only contractors who have been prequalified by the Authority will be invited to submit tenders. For this purpose contractors who wish their names to be included on a list to receive the Document for Prequalification are requested to submit the following information to the Authority's Consultants, Tipton and Kalmbach, Inc., at post office Box 589, Lahore, West Pakistan with a copy to their office at 831-14th Street, Denver 2, Colorado, U. S. A.:

1. Name of Company or Firm
2. Country of domicile
3. Full address, name and title of person to whom future correspondence should be directed.

The above information should be sent airmail to reach the offices of the Authority's Consultants on or before 16 January 1961. At that time interested contractors will be furnished with a document describing the work and setting forth the information required from them by the Authority in order to evalute their qualifications for undertaking the proposed canal construction.

Project Director (Links)
WEST PAKISTAN WATER & POWER DEVELOPMENT AUTHORITY

READ THE OFFICIAL
PROPOSAL COLUMN OF
ENGINEERING NEWS-RECORD
THIS WEEK AND EVERY WEEK

OFFICIAL PROPOSALS

Bids: January 26, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and Canal Law, Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 26th day of January 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, N. P. RONAN, Act. District Engineer, 353 Broadway, Albany 1, New York						
Greene (Rtes 23, 145)	TS 61-6	Cairo-Windham, Pt. 1, S.H. 5233; Cooksburg-Cairo, Pt. 3, S.H. 8413; South Cairo-Cairo, S.H. 887; Cairo Hamlet, S.H. 954	3.02 (0.62 Acc.)	Traffic Signs	$1,300 Plans $5	$23,000
Saratoga (Int. Trg. Rte. 87)	FISH 61-2	Interstate Route 502 (Lake Elizabeth to South Glens Falls) Project I-87-3(40)	7.12 (3.35 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' Var.= 7.10; Misc. Work = 0.02; Access = 0.80 Mi. Asph. Conc.; 1.87 Mi. Surf. Treatment; 0.68 Mi. Cem. Conc. Pavt. (Ramps) 3 H.G.S. Composite WF Beam Bridges 6 Spans 304' Total; 6 Spans 316.7' Total; 6 Spans 325.2' Total	$250,000 Plans $10	4,429,000
Saratoga (Int. Trg. Rte. 87)	FITS 61-3	Interstate Route 502 Clifton Park to Malta Project I-87-3(38)	9.28 (1.32 Acc.)	Traffic Signs	$3,500 Plans $5	61,000
Schenectady (Int. Trg. Rte. 890)	FIC 61-1	Int. Rte. Conn. 550: City of Schenectady (Edison Ave. to Broadway) Project I-IG-890-5(17)	0.30	Demolition of Buildings	$1,900 Plans $5	34,000
Warren (Int. Trg. Rte. 87)	FISH 61-3	Interstate Route 502 (Gurney Lane to Luzerne Road) Project I-87-3(37)	3.57 (3.28 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' Var.= 3.24 Mi.; Misc. Work = 0.33 Mi.; Access = 1.47 Mi. Cem. Conc. Pavt.; 0.38 Mi. Asph. Conc.; 1.43 Mi. Bit. Treat. Fdt. Crse.; 2 HGS Composite WF Beam Bridges 3 Spans 159' Total; 3 Spans 213' Total	$161,000 Plans $5	2,911,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Orleans	M 61-3	Canal Bridge E-189 Over Erie Barge Canal at Tuttles	....	Cleaning and Painting Superstructure	$160 Plans $5	2,700
DISTRICT No. 5, E. G. H. YOUNGMANN, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Chautauqua (Rte. 17)	R.C. 61-10	Falconer Village, S.H. 5067	0.98	Asphalt Concrete Type 2A	$22,000 Plans $5	386,000
Chautauqua (Rte. 60)	R.C. 61-8	Fentonville-Frewsburg, S.H. 8139	4.26	Asphalt Concrete	$16,000 Plans $5	290,000
Chautauqua (Int. Tr. Rte. 90)	FITATS 61-1	Int. Route 504, NYS Thruway, Erie Section Sub E-1A (Shortman Road Interchange) Project I-90-1(34)	1.42	Traffic Signs	$550 Plans $5	9,500
Erie (Rte. 5)	FAC 61-4	City of Buffalo: Fuhrmann Blvd. Art. Hwy. Cont. 1, (Tifft Street to Buffalo Skyway) Project U-750(21)	1.69 (1.14 Acc.)	Grading & Drainage = 1.49 Mi.; Misc. Work = 0.20 Mi.; Asph. Conc. Type 2A (Access) = 1.14 Mi.	$80,000 Plans $5	1,617,000
Erie (Rte. 5)	FAC 61-2	Hamburg Turnpike; City of Lackawanna Project U-750(22)	0.02	Pedestrian Overpass I-Beam—100' Span, Rein. Conc. Ramps—146'	$5,000 Plans $5	90,000
Erie (Rte. 5)	FATS 61-1	Lake Shore-Lackawanna City, S.H. 5019 (Mile Strip Road Interchange) Project U-750(23)	0.68 (1.60 Acc.)	Traffic Sighs	$450 Plans $5	8,000
Erie (Int. Rtes. 90 & 190)	FINYST 61-1	New York State Thruway Int. Rte. 504—Ontario Section —Sub. 11 & 12 (William St.-Cleveland Drive) Int. Rte. 506—Niagara Section—Sub. N1, 2, 3, 5, 6, 7, 8 (Ontario Sect.-Niagara Toll Plaza) Project I-90-1(35); I-190-1(36)	26.06	Beam Type Guide Railing Chain Link Fencing Cattle Wire Fencing	$14,000 Plans $5	257,000
DISTRICT No. 6, WM. J. DENNIS, District Engineer, State Office Bldg., 30 West Street, Hornell, New York						
Chemung (Rte. 328)	FARC 61-4	Southport Pt. 2, S.H. 28 Southport Pt. 1, S.H. 13 Project U-F-1122(2)	3.66	Asphalt Concrete = 3.29 Mi.; Misc. Work = 0.37 Mi. 2 H.G.S. Comp. I Beam Bridges 1 Span @ 62.4', 1 Span @ 66.4'	$110,000 Plans $5	2,052,000
DISTRICT No. 7, ROBERT W. SWEET, District Engineer, 444 Van Duzee St., Watertown, New York						
Clinton (Rte. 22)	DARC 61-1	Mooers Village, S.H. 930 Project RAD-13(2)	0.03	Alterations to Bridge No. 1 (Missile Route)	$450 Plans $5	8,000
Clinton (Rte. 191)	FARC 61-7	Chazy-Chazy Landing; Obers Cors. Scotia, S.H. 433 Project S-561(2)	0.22	Asphalt Conc., Type 1A = 0.19 Mi. Miscellaneous Work = 0.03 Mi.	$2,500 Plans $5	43,000
Jefferson (Int. Tr. (Rte. 81)	FITS 61-4	Int. Route 505: Section 7AB-2, FISH 59-16 (Pierrepont Manor to Adams: Section 7AB-3, FISH 57-21 (Adams-Adams Center) Project I-81-3(19)	7.08 (2.36 Acc.)	Traffic Signs	$1,100 Plans $5	21,000
DISTRICT No. 8, K. G. RAUER, District Engineer, Pleasant Valley Rd., Poughkeepsie, New York						
Westchester (Rte. 134)	FARC 61-3	Ossining-Kitchawan, S.H. 768 Project S-575(1)	2.38	Asphalt Concrete = 2.23 Mi. Misc. Work = 0.15 Mi.	$55,000 Plans $5	983,000
DISTRICT No. 9, J. C. FREDERICK, District Engineer, 71 Frederick Street, Binghamton, New York						
Broome (Rte. 17)	TS 61-5	Windsor-Deposit, S.H. 5338; Binghamton-Windsor, Pt. 4, S.H. 5241; Binghamton-Windsor, Pt. 3, S.H. 5148; Windsor Village-Main St. S.H. 1239	6.31 (2.70 Acc.)	Traffic Signs and Delineators	$1,200 Plans $5	22,000
Broome	FICR 61-1	Interstate Route 505 Five Mile Point to Broad Ave. Project I-81-1(8)8	....	Cemetery Removal	$7,000 Plans $5	123,200
DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
New York (Int. Tr. Rte. 78)	FILME 61-1	Interstate Route Conn. 513 Lower Manhattan Expressway (Expressway Structure Under Chrystie Street) (Contract No. 1) Project I-78-1(43)	0.03	Abutments, Piers and Miscellaneous Work to Support Subway Structure Across Depressed Expressway	$63,000 Plans $5	1,148,000
Suffolk	FASH 61-1	Sunrise Highway Extension (Upton Blvd. to Eastport Manor Road) Project F-947(24)	7.41 (11.74 Acc.)	9" Cem. Conc. Pavt. 2 @ 24' = 7.23 Mi.; Misc. Work = 0.18 Mi.; Acc. 9" Cem. Conc. 15' & Var.= 1.40 Mi. Asphalt Concrete = 10.34 Mi.; 8 H.G. Segs Comp. Steel Beam, 1—3 Spans 99'; 6—4 Spans 236', 206', 229', 223', 210', 216', 1—4 Span Twin 281' and 273'	$450,000 Plans $10	7,760,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: January 10, 1961

Intake Works and Outlet Works of the West Delaware Tunnel Contracts 456 and 457

SEALED BIDS will be received by the Board of Water Supply at its offices, thirteenth floor, 120 Wall Street, New York 5, N. Y., until 11:00 A.M. Eastern Standard Time, on Tuesday, January 10, 1961, for the following two contracts for the construction of the Intake Works and the Outlet Works of the West Delaware Tunnel, all as set forth in the specifications:

Contract 456, for the construction of the Intake Works of the West Delaware Tunnel, including a road to the intake chamber; for installation of equipment; for stream control; and for other appurtenant work. The site of the work is about one mile east of the hamlet of Cannonsville, in the town of Tompkins, Delaware County, New York.

Contract 457, for the construction of the Outlet Works of the West Delaware Tunnel, including the installation of a steel interlining at the outlet end of the tunnel; for the installation of equipment; and for other appurtenant work. The site of the work is about 1¼ miles east of the hamlet of Grahamsville, in the town of Neversink, Sullivan County, New York.

A bidder on both of these contracts may, if he so desires, specify in the bid form of either or both contracts that he will agree to make a percentage reduction from the total cost of the contract, if both contracts are awarded to him.

Contract pamphlets can be obtained in the Secretary's office, Room 1312, at the above address, upon application in person or by mail, by depositing the sum of $10.00 for a set of pamphlets for each contract. There will be a charge of $2.60 to cover mailing costs for each set of contract pamphlets.

Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars apply at the office of the Chief Engineer at the above address.

ARTHUR C. FORD, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

Bids: January 24, 1961

Spruce Run Reservoir Project Spruce Run Dam, Dikes and Appurtenant Works—Contract SR-1

SEALED BIDS will be received from bidders by the Department of Conservation and Economic Development, at its offices, first floor, 205 West State Street, Trenton, N. J., at 11:00 A.M. Eastern Standard Time, on Tuesday, January 24, 1961 and will be opened and read immediately thereafter, for Contract SR-1 for the construction of the Spruce Run dam, dikes A and B, spillway weir and channel, outlet tower and outlet works, gaging weir, access roads and final grading in vicinity of dam, installation of equipment and other appurtenant work, all as set forth in the specifications. The Spruce Run dam will be approximately 6000 feet in length along the top, will have a maximum height of about 83 feet and will be constructed of earth compacted by rolling. The limestone foundations under the dam, dikes and certain zones on the perimeter of the reservoir will be grouted as specified. The work is located near the Town of Clinton, Hunterdon County, New Jersey. Bids will be accepted only from bidders prequalified with the Department of Conservation and Economic Development in accordance with R.S. 52:35.

The bid, accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey in an amount not less than 2 percent of the bid, an Agreement of Surety, an Affidavit of Non-Collusion, the name and address of the prequalified subcontractor to do the grouting, drilling, core boring and sampling, an Appointment of Agent by Non-resident Bidders and a revised Financial Statement and Plan and Equipment Statement on prequalification forms, must be enclosed and sealed in an envelope provided for that purpose by the Department. Bids not so submitted will be rejected. Bids must be delivered at the above place on or before the hour named, as no bids will be accepted after the hour specified.

Contract pamphlets containing information for bidders, forms of bid and contract, specifications, requirements as to surety and subcontractor for grouting etc., and separate folders of contract drawings can be obtained in the office of the Chief Construction Engineer of the Bureau of Design and Construction of the Division of Water Policy and Supply of the Department of Conservation and Economic Development, 219 West State Street, Trenton, N. J., upon application in person or by mail, by depositing the sums of $15.00 for each contract pamphlet and $10.00 for each folder of contract drawings. The deposit for the contract pamphlet will be refunded within 30 days of the award of contract upon the return of such document in good condition without written entries. Deposit will not be refunded for the folder of contract drawings. For further particulars apply to the office of the Chief Construction Engineer.

The Commissioner reserves the right to select the bid, the acceptance of which will be most advantageous to the State, price and other factors considered. Any and all bids may be rejected when the Commissioner determines that it is in the public interest so to do.

Salvatore A. Bontempo
Commissioner of Conservation
and Economic Development

District of Columbia—Building Construction—Dept. of Bldgs. & Grounds, D. C., Dec. 8, 1960. CONSTRUCTION OF BERTIE BACKUS JUNIOR HIGH SCHOOL, South Dakota Ave. and Hamilton St., N.E., Wash., D. C. (Invitation No. C-6162-B). (Wage rates have been predetermined by Labor Dept.). Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $125.00 per set, payable to D. C. Treasurer. (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EST, Jan. 19, 1961, in Rm. 424, 499 Penn. Ave., N.W.

Bids: January 23, 1961

Invitation to Bidders City of Birmingham, Alabama

Sealed proposals for the construction of the Nineteenth Street Underpass will be received by the City of Birmingham in the office of the City Engineer, Room 500, City Hall, Birmingham 3, Alabama, until 10:00 a.m. C.S.T., January 23, 1961. Proposals will not be received after this hour. Immediately thereafter, the Proposals received will be publicly opened and read in the same office.

This Contract covers the construction of a ten (10) track underpass structure of two (2) spans carrying two (2) main line tracks and two (2) additional tracks of the Alabama Great Southern Railroad Company and two (2) main line tracks, four (4) station tracks and two (2) station platforms of the Louisville and Nashville Railroad Company over the two (2) forty (40') foot roadways and six and one-half (6½') foot sidewalks of Nineteenth Street in the City of Birmingham, together with the demolition work, earthwork, paving, lighting, utilities construction and other appurtenant work.

The work includes, in part, the following approximate quantities as well as other items not listed below:

Common Excavation, 27,000 c.y.; H-Section Steel Piles, 3,190 l.f.; Untreated Timber Piles, 4,760 l.f.; Untreated Timber, 56 m.f.b.m.; Concrete (Substructure), 1,910 c.y.; Reinforcing Steel, 310,000 lbs.

Prestressed Concrete Deck Alternate: Prestressed Concrete Girders, 1,110 c.y.; Cast-in-Place Concrete, 510 c.y., Reinforcing Steel, 332,000 lbs.

Structural Steel Deck Alternate: Fabricated Carbon Steel, 2,095,000 lbs.

A Proposal Guaranty in the form of either cashier's or certified check in an amount not less than ten (10%) per cent of the total amount of the bid submitted, must accompany each Proposal submitted. The Proposal Guaranty shall be payable to the City of Birmingham.

No Proposal will be considered unless submitted by a qualified Bidder, who must conform with the provisions of Act No. 571 of the 1959 Alabama Legislature. Proposals shall be sealed in envelopes.

Full information and Proposal forms are available in the office of the City Engineer, Room 500, City Hall, Birmingham 3, Alabama. Plans, Specifications and Contract Documents may be inspected at the office of the City Engineer, Room 500, City Hall, Birmingham, Alabama, or at the office of G. A. Heft & Co., Consulting Engineers, 820 Union Street, New Orleans 12, Louisiana, or may be obtained from the former office upon payment of

Fifty ($50.00) Dollars per set.

In no event will Proposal forms be issued later than twenty-four (24) hours prior to the hour and date set for receiving Proposals.

The City reserves the right to reject any and all Proposals.

CITY OF BIRMINGHAM
Alton L. McWhorter
City Engineer

Bids: March, 1961

Kingdom of Thailand Royal Irrigation Department Bangkok, Thailand

INVITATION FOR BIDS—NO. YS-2-17

The Royal Irrigation Department of the Kingdom of Thailand hereby invites sealed written bids for furnishing and delivering the following equipment either fob Contractor's shipping point or cif Bangkok Wharf, Thailand, for the Bhumiphol Power Plant, Yanhee Multipurpose Project, Kingdom of Thailand, in accordance with the Contract Documents:

- Three (3) cooling water pumps, centrifugal type, capacity 5,680 liters per minute (1,500 gpm), total head 18 meters (60 ft.);
- Two (2) cooling water pumps, centrifugal type, capacity 1,930 liters per minute (510 gpm), total head 17 meters (55 ft.);
- One (1) water booster pump, regenerative turbine type, capacity 190 liters per minute (50 gpm), total head 120 meters (400 ft.);
- One (1) water booster pump, regenerative turbine type, capacity 53 liters per minute (14 gpm), total head 22 meters (75 ft.);
- Two (2) water sump pumps, vertical turbine type, capacity 17,000 liters per minute (4,500 gpm), total head 15 meters (50 ft.);
- Two (2) water sump pumps, vertical turbine type, 2,300 liters per minute (600 gpm), total head 36 meters (120 ft.);
- Four (4) oil pumps, rotary geartype, 76 liters per minute (20 gpm) at 7 kg per sq. cm. (100 psi) discharge pressure.

Invitations for Bids will be issued in January, 1961, and will be opened in March, 1961. Copies of Contract Documents, Invitation for Bids—No. YS-2-17, Water Pumps and Oil Pumps, may be obtained by qualified Bidders on written request to:

Royal Irrigation Department
Attention: Thai Liaison Engineer
c/o Engineering Consultants, Inc.
1901 South Navajo Street
Denver 23, Colorado

Each request must be accompanied by a check or money order, payable to the Royal Irrigation Department, in the amount of U. S. $10.00 for each copy of the Contract Documents requested. The remittance is nonreturnable.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department
Kingdom of Thailand
Bangkok, Thailand

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5464) will be received at Vernal, Utah, until 10 a.m., Mountain Standard Time, February 7, 1961, for furnishing labor and materials for Earthwork, Concrete Lining, and Structures, Stanaker Service Canal, Vernal Unit, Utah, Central Utah Project. Location near Vernal, Utah, in Uintah County. Principal items are excavation 398,000 cu. yds.; concrete in structures 4,100 cu. yds.; 9,100 lin. ft. concrete pipe; and other work. Completion time 390 days. For particulars, address Bureau of Reclamation, P. O. Box 360, Salt Lake City 10, Utah; 64 East Main Street, Vernal, Utah; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSAL

RATE $2.70 per line (or fraction) per insertion.
CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.
SEND COPY: Official Proposal Division, Class. Adv. Div.; Engineering News-Record, P. O. Box 12, New York 36, N. Y.

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SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Estimator — For established contractor in Deep South Metropolitan area, specializing in Heavy Construction, Foundations and Sewer and Water Plants. Graduate Civil Engineer, Age 30 to 38 preferred. P-5645, Engineering News-Record.

Electrical System Design Engineer. At least 3 years experience in transmission, distribution or substation design. Resident Engineer — experienced in construction of rural type transmission, distribution and substation facilities. These openings offer permanent employment with opportunity for advancement, with long-established Midwest consulting firm. P-5810, Engineering News-Record.

Engineer—Estimator—Experienced in plant, mill and highway bridge construction. Location — Jacksonville, Florida. Send complete resume with anticipated salary to: P-5806, Engineering News-Record.

General Superintendent for roads, sewers and utility work in New Jersey area. Give full details as to age, experience, marital status and salary desired. P-5803, Engineering News-Record.

Civil Engineer. Construction materials company with 32 locations in New Jersey & Pennsylvania has an opening in engineering department for engineer with experience in aggregate plant layout and design. Excellent working conditions, fringe benefits. Send resume to Houdaille Construction Materials, Inc., 10 Park Place, Morristown, N. J., Attention Personnel Manager.

Highway Design Engineer, preferably regis-tered, to head up the preparation of contract in Connecticut. Minimum 5 yrs. experience required. Salary $7800-9000. Send complete resume. P-5816, Engineering News-Record.

Equipment Superintendent or Master Me-chanic to organize and manage a maintenance and repair program for a medium size highway contractor. Midwest Location. P-5853, Engineering News-Record.

Sales Engineer—Sales positions open with large form manufacturer selling to contractors. Some knowledge of construction essential. If you are interested in a real opportunity for high earnings with a company that has made steady progress in the industry, write giving qualifications and resume of experience to P-5854, Engineering News-Record.

Project Manager—for medium size building contractor located in central Connecticut. Graduate engineer preferred. Experience required in subcontracting, coordination with architects, engineers, and owners, scheduling and expediting. Senior position with excellent opportunity for advancement. Send full details and salary requirements. P-5851, Engineering News-Record.

• POSITIONS VACANT

Lead Draftsman—Concrete Reinforcing Steel Engineering Dept. Should have 5 yrs. experience in detailing Reinforcing Steel. Experience in estimating and sales also desirable but not necessary. Salary open. Write: Phoenix Manufacturing Co., Division of Union Tank Car Company—Attn: Mr. C. E. Hunt, P. O. Box 1207, Joliet, Illinois.

Creative Structural Engineer. To participate in analytical development of advanced reinforced and prestressed concrete structures. Work includes design development, technical writing and opportunities for engineering consultation and lecturing before professional groups. Small amount of traveling. Degree in Civil Engineering required, with advanced degree in structures desirable. Concrete structural design experience required. Familiarity with prestressing and concrete shells desirable. Must be able to use advanced mathematics as a tool in developing new design methods. Job located at Chicago headquarters of a national engineering organization. Excellent working conditions and advancement opportunities. Salary commensurate with experience and ability. Maximum age forty. Submit complete outline of background and experience. P-4058, Engineering News-Record.

Experienced civil engineer for southern Con-necticut in estimating and supervising site work. Age limit, under 50. Send all pertinent facts, salary desired, etc. P-5858, Engineering News-Record.

Production Manager for prestressed, precast concrete firm in Northeast area. Requirements: Background of experience in structural engineering desirable but not necessary. Must be able to coordinate manufacturing schedules and plant capacity, control quality, cost of production, warehouse receiving and shipping of material. Must be able to stimulate maximum efficiency and productivity of both supervisors and production workers. Submit complete resume, references, salary requirements and date of availability. P-5856, Engineering News-Record.

Designing Engineer with estimating experi-ence for prestressed, Precast concrete firm in northeast area. Requirements: Must have had experience in design of prestressed, precast concrete materials. Good opportunity for qualified, experienced man. Submit complete resume, references, salary requirements and date of availability. P-5861, Engineering News-Record.

Civil Engineer—Experienced in Subdivi-sion layout and calculation, water and sewer design, drainage studies, etc. Permanent, give resume and salary desired. Denver, Colo. P-5857, Engineering News-Record.

Building Commissioner for a progressive and expanding middle western city of 40,000 population. Requirements are a college education in civil or architectural engineering, with a minimum of 5 years practical experience. Administrative and organizational ability are very desirable. Age range of 28-50. Reply should state salary desired, a resume of qualifications and availability. P-5837, Engineering News-Record.

Bridge Designer. Creative, interesting work in progressive organization offering career opportunities under Civil Service. Civil Engineers with experience in structural drafting or design. Beginning salary $480-600 per month depending on previous experience and training. Write Personnel Division, Oregon State Highway Department, Salem, Oregon.

Top Construction Superintendent, N.E. United States—experienced in large building projects with General Contractor performing their own excavation, concrete and masonry. Send resume, salary requirements, availability, and other pertinent data. P-5872, Engineering News-Record.

Wanted—Building Construction Sales Engi-neer. Must have 10 years experience in building construction. Prefer C.E. Education. P-5873, Engineering News-Record.

• POSITIONS WANTED

Construction Manager: Mechanical, some experience General Construction. Experience in Management, Estimating, Negotiating & Selling. From Rumor to Reality. Following of top Construction Men. Good Customer Contacts. Desire position with opportunity. Resume on request. PW-5759, Engineering News-Record.

General Manager, Contract Admin. Estimat-ing, methods, claims, 22 yrs. hvy. constr. major projects U.S. & O.S. PW-5864, Engineering News-Record.

• POSITIONS WANTED

Construction Manager or General Superin-tendent Civil Engineer registered in Pennsylvania. Twenty-five (25) years experience in general construction field including engineering consultation with owners, site and location study, design and preparation of plans, estimating, submitting proposals, purchasing, negotiating subcontracts; and organizing, scheduling and supervising projects. Salary $10,000.00. PW-5835, Engineering News-Record.

Construction Executive C.E. 33, married, pipeline-Road-Waterworks — General Construction and capital equipment sales experience, seeking relocation in construction business. Available. PW-5850, Engineering News-Record.

B.C.E., Age 32, Reg. N. Y. & Pa., married, 4 years large bridge design, 3 years CEC, USN, 2¼ years steel detailer. Wish to relocate to upstate New York. Desire position with future in strctural design. PW-5860, Engineering News-Record.

I am looking for an old line general contract-ing company with an established reputation which is desirous of being revitalized. I believe that my background, education, training and experience are such that I could sparkplug this company back to life. Graduate, registered civil engineer have character and integrity. PW-5855, Engineering News-Record.

General Superintendent—41, C.E. Graduate. Entire career with major contractors on heavy construction and heavy industrial projects. Past six years with top U.S. contractor on nation-wide, multi-million dollar, competitive bid projects. Excellent experience on Atomic installations and missile Sites. Desire position in California with large contractor or will consider participation arrangement with smaller concern. PW-5866, Engineering News-Record.

General Supt. 44, 20 years experience on heavy industrial, commercial, chemical and institutional work. Engineering background. PW-5869, Engineering News-Record.

Grad. Civil Engineer—E.I.T. 1 yr. experience in construction supervision. Desires position in field or comb. of field and office in N.Y.C. area. Military obligation complete. Attending graduate school evenings. PW-5870, Engineering News-Record.

Project Manager—33 years experience in-dustrial and heavy construction, mechanical and structural projects. Estimates and negotiations to completion. Location immaterial or will travel. Successful record as Manager of Construction Division for National Constructor. Education M.E. PW-5737, Engineering News-Record.

Project Mgr.—Const. Supt. Flood Control, Bldgs., Roads, Tunnels, excellent Mech. background, available now. 9238 East Parkhill Drive, Washington, D.C.

B.S.C.E. Age 37, Reg. Ky. Married 9 years experience supervision power industry. 2 years experience highway engineering. Prefer South or Midwest. Available February, 1961. PW-5778, Engineering News-Record.

Construction: Graduate Engineer, extensive experience including industrial and chemical plant, need job, go anywhere. PW-5767, Engineering News-Record.

Construction Supt., Engineer. Twenty years experience on buildings, available soon. PW-5818, Engineering News-Record.

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Estimating Engineer—Analyst. Preparation/ analysis of estimates, costs, budgets, financial/economic studies, for construction/operation of high-pressure, high-temperature steam, chemical plants, foundry, metalworking shops; knowledge EDP, computer programming; $11,200. PW-5849, Engineering News-Record.

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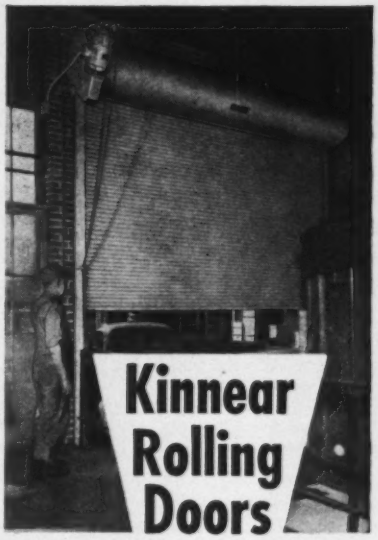

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Your Move, Senator Kerr

IT IS JUST POSSIBLE that last month's National Conference on Water Pollution (ENR Dec. 22, 1960, p. 38) might turn out to be something other than wasted effort. If it does, however, its objectives will have to be pursued by others than its original sponsors.

The three-day meeting looked on the surface a good deal like other technical and professional conferences on the subject. The faces, the topics and a great many of the speeches and ideas were familiar. But it was an unusual gathering in two respects: sponsorship and timing.

The sponsor was no less than the President himself; the meeting was the first White House conference on this subject. Since Mr. Eisenhower inserted the conference suggestion into the message announcing his veto last February of a bill to increase sewerage construction grants, it is not completely cynical to suppose that at least one of his aims—if not the chief one—in calling the conference was to insure a sustaining vote for the veto by teasing some lukewarm backers of the bill into a mood to wait and see.

Timing of the conference was less understandable. It would have been impossible to schedule the meeting at a time more likely to risk making it political poison. Both the President and his number one instrument in calling the conference—Health-Education-Welfare Secretary Arthur Flemming—will be out of office in less than a month. And it will be up to their Democratic successors to take the necessary follow-up steps (if any) of recommending legislative action or study to implement or further refine the work of the conference. Without such additional moves, the conference, as a major effort in the campaign against water pollution, will have flopped. Thus will have been confirmed the misgivings of those who since the meeting was announced have viewed it as a lame-duck effort foredoomed to failure.

Fortunately, there are elements tending to offset the built-in self-destructive character of the conference. One of them is the non-partisan nature of most of the ideas presented. Another, perhaps more important, is the fact that there are parallel efforts under way bearing a Democratic label of origin.

The men and the ideas would be the same no matter who called the conference. The participants were men with active records in the field, and in most cases what they said at this conference is similar to what they have said in the past and will continue to say in the future, because it is what they believe. This measure of constancy is important because it puts anything of value in this conference in politically neutral territory, where it can be picked up and carried forward under either political banner.

The most notable parallel Democratic effort is the all-but-completed two-year study by the Senate Select Committee on National Water Resources. Hopefully, for the sake of progress, the chairman of this group, Sen. Robert S. Kerr (D., Okla.), voiced sentiments of political tolerance—even "togetherness"—toward the conference objectives. "For whatever reason this conference was called, it can, and will, accomplish something real by spurring the necessary action," he declared. "Why isn't this the time and place," the Senator suggested, "to start an organized campaign?"

Why not indeed? We can't think of anybody in a better position right now to answer the question than Senator Kerr himself. He will report to the Senate, probably late this month, the findings of the most comprehensive water resources study ever made for such a huge area as the U.S. On water resources, including the pollution problem, his will be the most authoritative voice in the most authoritative body in the country.

Roads in Good Hands

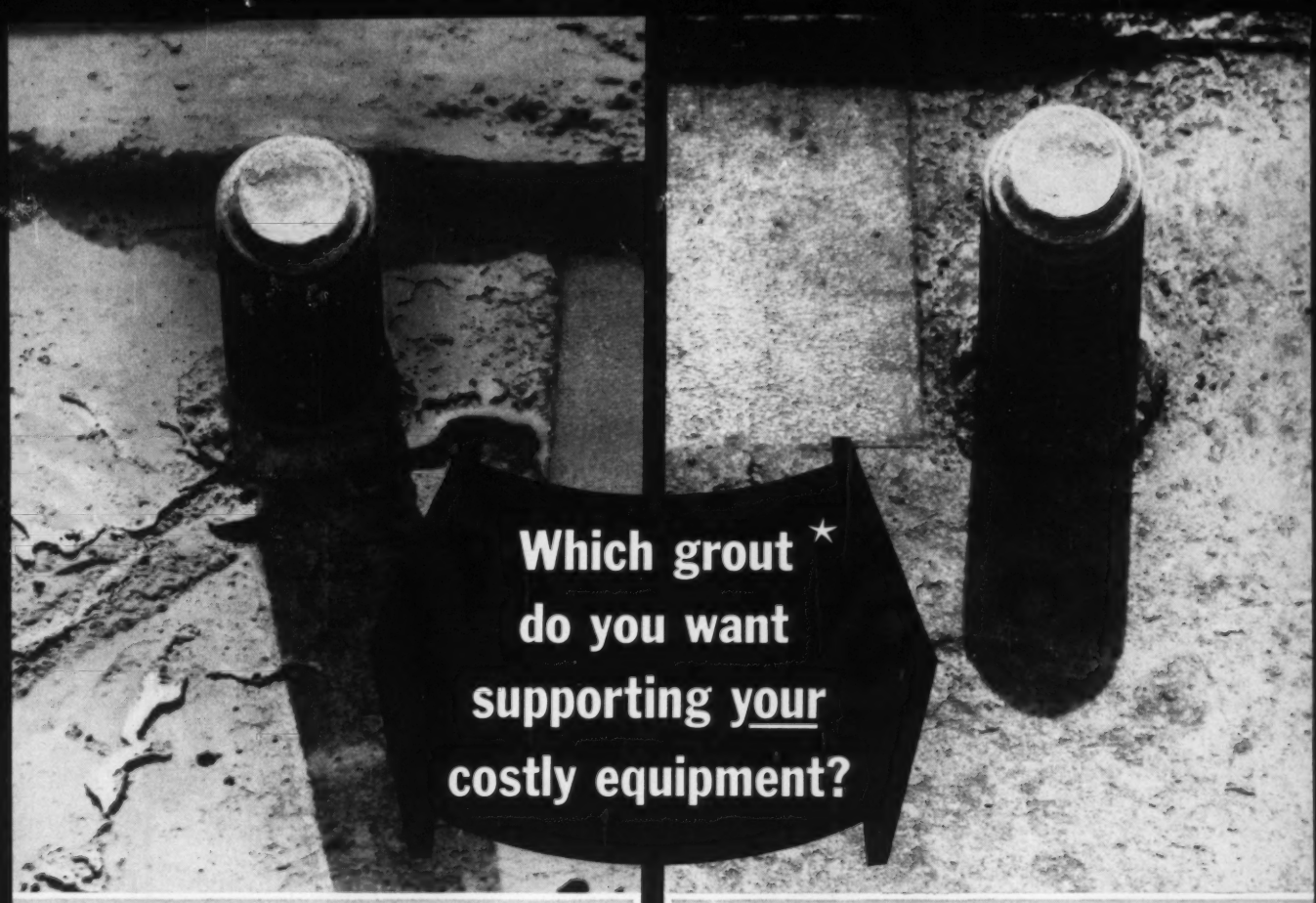
THE KENNEDY ADMINISTRATION has acted wisely in selecting Rex M. Whitton, chief engineer of the Missouri State Highway Department, to succeed Bertram D. Tallamy as Federal Highway Administrator (see p. 23).

Mr. Whitton has a lifetime of experience in highway engineering and administration. A long-time leader in the American Association of State Highway Officials and an ex-president, he is equipped to maintain an effective working relationship with the state highway departments and other highway agencies. And his appearances before Congressional committees have made him many friends in Congress. Attesting to his popularity among highway officials, he is the only man ever to receive both the Bartlett and the Thomas H. MacDonald awards.

The Missourian's principal responsibility will be the care and feeding of the federal-aid highway program, including the vital Interstate system. As a consequence, from the standpoint of its influence on construction, Mr. Whitton's new post is probably the most important sub-Cabinet assignment in the federal government.

The post of Federal Highway Administrator was created by the federal-aid Highway Act of 1956. Only two men have filled it. John A. Volpe, contractor and newly elected governor of Massachusetts, served for a few months on an interim basis. Mr. Tallamy came from the New York State Thruway Authority four years ago and, during a difficult and trying time, developed the position into one of distinction and effectiveness.

Mr. Whitton has accepted a challenging job at a critical time in the history of the federal-aid highway program. His will be the task of advising Congress on such questions as whether the Interstate program is to be cut back or enlarged, what should be done about tollroads and what use is to be made of the AASHO road test results. All signs indicate that the job will be in capable hands.



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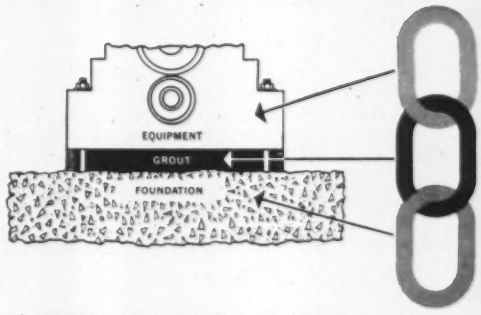

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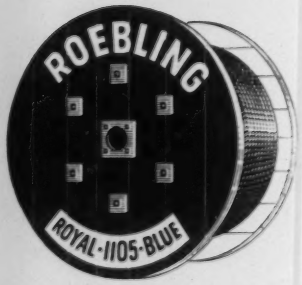

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